AVIATION

The Oldest American Aeronautical Magazine

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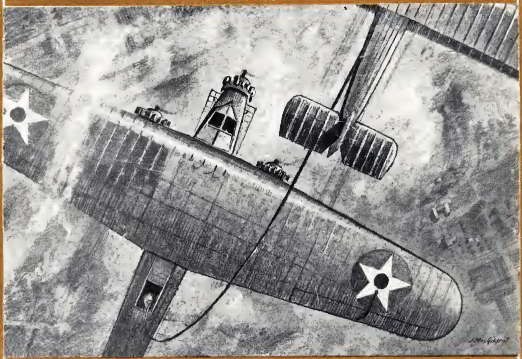

Pencil drawing by John MacGilchrist of the refueling of the "Question Mark"

VOLUME XXVI

NUMBER 4

Special Features

The Verville "Air Coach"

Seeding of Waste Lands by Airplane

The Overhead Expense of Direct Labor

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Dirigibles, Graf Zeppelin, Friedrichshafen, Germany to New York 6000 miles (estimated).

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Major Carl Spatz, Commander. Chief Pilot Capt Ira Eaker, Relief Pilots, Lt H A Halvorsen, Lt Elwood R. Quesada and Sergeant Roy W. Hooe

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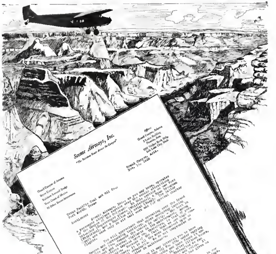

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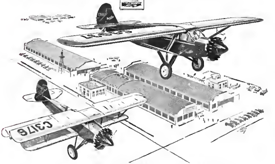
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A Well Earned Award

WITH the announcement of the award of the Collier Trophy for 1928 to the Aeronautics Branch, Department of Commerce, comes the sincere belief that a well earned award has been made. Since its inauguration the Aeronautics Branch has been hampered in the efficient performing of its work by the lack of adequate personnel and appropriations. However, under the able and diligent guidance of Assistant Secretary William P MacCracken and Maj Clarence M Young, the Branch has functioned remarkably well

If the amount of time "spent on duty" can be taken to count for anything, the Aeronautics Branch has most certainly more than justified its existence. Although few realize it, the personnel of the Branch has virtually worked day and night at the many tasks that call for immediate attention. When one considers that the Aeronautics Branch is, figuratively speaking, the American aeronautic industry's "Board of Appeals" one can to some extent visualize the almost unlimited scope of its work

During the past year alone, thousands of applications for aircraft, pilots' and mechanics' licenses have been received and attended to; sections of the Regulation Division have been reorganized to the point where the Division now renders even better service to the industry, the Inspection Department has been placed upon a more efficient and workable basis, as have also the Engineering Section, the Medical Section, the Airways Division, the Air Information Division, the Communications Section, the Publications Section, and the Research Division, etc All that, to say nothing of the effective handling of thousands of complaints and petty grievances that have been brought to the Branch's doorstep

Funds for Research

THERE certainly is no lack of capital available for the aviation industry at the present time In fact it seems to be far easier to obtain money than to know how to spend it wisely The need for capital to increase production has been met for the time being at least. Airlines have been able to purchase up-to-date equipment, and aerial service operators have been reasonably supplied with capital Yet, the sale of aeronautical securities continues and the public is still insistent upon buying into this great new industry This condition has led to conditions which are far from healthy Not only has speculation driven the price of many aeronautical securities up to a price which is not warranted, but money is being put into ventures which have not been sufficiently carefully worked out before the capital was raised There is bound to be a reaction to the present enthusiasm for aeronautical securities

It is obvious that the present enthusiasm and prosperity should be taken advantage of, but the method of doing so is difficult to outline It would seem, though, as if it might be possible for private companies to formulate plans for research work which would extend over a period of years The larger companies in fields such as chemistry, metallurgy and electricity, carry on pure research work which is not designed to lead to immediate commercial gains along paths which can be foreseen at the time when the experiments are begun A good deal of work of this nature is being carried on in national laboratories especially in Germany, but it would seem as if with the amount of capital available that some of this work could also be carried on by private companies Almost every imaginative engineer has certain problems into which he would like to delve, and some few of them have the rare ability to work out fundamental theories and underlying principles. The working out of abstract problems broadens the mental outlook and a company which has engineers capable and allowed to do work outside of the strict routine of producing a commercial plane will have a very decided advantage

Calcium Chloride

THE dust problem on flying fields is a serious one and most of the remedies put forward so far have been very expensive Several fields tried the use of calcium chloride last summer with some success This chemical attracts water and has been widely used on driveways and other places where it was inadvisable to lay down a tarred surface or concrete Its proper use lessens the dust evil though it cannot be said to completely eliminate it

In our issue of Dec 15, 1928, an article was printed on its use and application Several letters of protest have been received stating that calcium chloride accelerated corrosion and that its use might be accompanied by a considerable amount of danger from this source

To quote Admiral Moffet:

> "It is generally known that calcium chloride is an active corrosive agent, especially when in contact with aluminum alloys We have had in the past considerable trouble from the use of calcium chloride as an anti-freeze agent. I would be fearful that if calcium chloride is used on aviation fields small particles might be carried back by the propellor blast and deposited on metal parts of the airplanes or engines and later cause serious difficulties"

With a plane whose structure was properly protected by good paints and varnishes there would probably be little danger of the calcium chlorides getting in to the metal surfaces There is, however, no need of taking these extra chances and naturally field operators will not wish to run the risk of possible extra corrosion in the planes operating from their fields

The New Fairchild Planes

Low Wing Training Craft and Four Place Whirlwind Powered Cabin Monoplane Added to Line and "Wasp" Transport Improved

THREE airplanes designed to cover a wide range of requirements are now being produced by the Fairchild Airplane Manufacturing Corp, Farmingdale, L I All three of these are monoplanes, two being cabin craft of the high wing type and one a low wing open cockpit training plane The largest, which is designated "The Fairchild 71," is similar to the FC2W2 Wasp powered cabin plane which has been in production for some time The "71" embodies a number of improvements in streamlining and interior finish over the FC2W2 but is structurally and aerodynamically the same The two more recent developments, the "21" two place training plane and the "41" four place cabin monoplane, are of conventional construction with the exception of the tail surface structures, which are built up of riveted "Alclad" channel members

Designed for Instruction Needs

The Fairchild 21 has been designed specifically to fill the requirements for an instruction plane It is of the semi-cantilever type with a tandem seating arrangement, and is powered by a Genet five cylinder radial air cooled engine developing 80 hp at 2,200 r p m The Fairchild 21 has a wing span of 28 ft 3 in, and a length of 21 ft 6 in The weight empty is 755 lb, the disposable load 495 lb, and the gross weight 1,250 lb In tests the plane attained a high speed of 105 m p h, a cruising speed (at 1,880 r p m.) of 90 m p h and landed at 40 m p h The initial climb is 700 ft per min and the service ceiling 9,440 ft.

Three color outside finishes in any one of a number of stock combinations or to any specification, are available. The finish is Berryloid and consists of nine coats sprayed on and sanded under controlled temperature and humidity conditions

The wing is in two sections attached at the lower longerons and is of constant chord with the exception of the tips, which are elliptical in plan form No departure from conventional practice is found in the construction, which consists of box spars and spruce ribs, the latter being placed closer together than necessary for structural purposes, in order to provide a smooth wing contour Bearing surfaces of all drag bracing fittings on the wing are large so that the bracing will not become loose or be pulled into the wood A Gottingen 387 airfoil section is employed The wing is set at 0 deg incidence and the dihedral angle is 2½ deg Two streamline struts attached to the fuselage at the upper longeron are used in the external bracing of each wing panel Ailerons, tapered in plan form, are hinged to the rear spar and balanced to compensate for yaw Differential action, 30 deg upward and 10 deg downward is provided

Fabric Covering on Fuselage and Wing

The fuselage is constructed entirely of welded chrome molybdenum steel tubing reinforced at the joints with plates of the same material Hot linseed oil is sealed in the tubing to prevent corrosion The entire fuselage is assembled on a master jig, resulting in interchangeability of wings and landing gear with any fuselage Fabric covering is used on both fuselage and wing structure

As previously mentioned, the tail surfaces are built up of Alclad channel members riveted together with ⅛ in heat treated duralumin rivets Heat treated steel bolts are used, however, where fittings are attached The main members of the structure are of 035 in material, while the inner bracing members are of .020 in stock. The tail surface structure also is covered with fabric

Elevators and rudder are unbalanced and so constructed as to be interchangeable The stabilizer is built

Side view of the new "Genet" powered Fairchild "21" training plane

in two interchangeable sections Tail surfaces are externally braced by streamline steel wires Rigid attachment of the stabilizer to the fuselage in any one of three positions makes it possible to anchor fin and stabilizer to the fuselage with streamlined steel wires, precluding the possibility of tail flutter

Landing gear is of the divided axle type, having a tread of eight feet and wheels located considerably forward of the center of gravity of the plane to reduce the possibility of a tail high landing or of nosing over Combination oil and spring type shock absorbers are used and have a total travel of 10½ in The first six inches of this travel is cushioned on oil alone The landing angle is 11 deg, and the stalling angle of the wing is 18 deg These characteristics are highly desirable in a training plane as there is no tendency in a high landing for the nose to whip down On the other hand, if a student tends to make a landing below the ground, the easy action of the oleo struts changes the angle of attack so slowly that there is no tendency to bounce Wheel brakes are standard equipment

Rubber Tired Wheel Used

Instead of the usual tail skid, a rubber tired wheel is employed, using the new 14x3 in tire This wheel is mounted in a fork which is free to travel the full 360 deg in the horizontal plane Swiveling, however, is restrained by rubber shock absorber cords of such size as to prevent oscillation of the wheel in taxiing, but to allow the wheel to deflect when striking ruts or when turning The fork is mounted in a frame which is pivoted to the fuselage and is free to move upward and backward The entire mounting assembly is placed within the fuselage and can be removed as a unit for inspection or repair Oleo and spring shock absorbing mechanism is employed with a total travel of 8 in in addition to the cushion of the tire

All instruments, including Pioneer air speed indicator, altimeter, tachometer, oil pressure and oil temperature gauges, are located in the student's cockpit and instruments in the front cockpit are optional A Hamilton wooden propeller also is standard equipment Cowling includes a quickly removable magneto cover in front of the engine. An exhaust manifold of the collector ring type is carried in a deep recess and does not project beyond the surface of the cowling The oil tank can be removed without disturbing the rest of the installation.

Fuel is carried in a 20 gal tank in the fuselage and feeds by gravity to the carburetor The gasoline line is so attached that no gasoline can be trapped in the tanks and no part of the line passes through the cockpit All copper gasoline and oil lines are annealed Gasoline flow is controlled by a valve on the fire wall and a strainer and water trap are included in the fuel system

Leather upholstery and Marshall spring cushions are used in the cockpits Heel operated brakes and dual stick and rudder pedal are provided

The specifications of the Fairchild 21 as furnished by the manufacturer are as follows

Wing span	28 ft 3 in.
Length	21 ft 6 in.
Wing area	139 sq ft
Aileron area	16 68 sq ft
Elevator area	9 sq ft.
Rudder area	4 5 sq ft
Stabilizer area	13 sq ft
Airfoil section	Gottingen 387
Weight empty	755 lb
Disposable load	495 lb
Gross weight	1,250 lb
Power plant	Genet (80 hp at 2,200 r p m)
High speed	105 m p h
Cruising speed (1,880 r p m)	90 m p h.
Landing speed	40 m p h
Initial climb	700 ft per min
Service ceiling	9,440 ft
Cruising range	425 mi.

The Fairchild 41, cabin monoplane, which accommodates three passengers and pilot, has been designed to meet the demand for a fast and comfortable plane of small capacity It is equipped with folding wings and therefore can be stored in a relatively small space This feature makes it adaptable to private ownership. It is powered with the Wright Whirlwind J-5 engine

This airplane has a wing span of 36 ft, a length of 25 ft and a height of 8 ft The width with wings folded is 12 ft 6 in The weight of the plane empty is 1,780 lb, the disposable load 1,220 lb and the gross weight 3,000 lb The high speed is 130 m p h, cruising speed (at 1 650 r p m) 108 m p h and landing speed 49 m p h In tests the plane attained an altitude of 5,350 ft in 10 min The initial climb is 720 ft per min and the service ceiling 12,400 ft Color options and finish are the same as the Fairchild 21

One of the outstanding characteristics of the Fairchild 41 is the combination of folding wings and a relatively wide landing gear tread This is made possible by the use of wing stubs of triangular plan form rigidly attached to the top of the fuselage and each braced to the

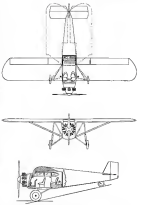
Front quarter view of the Wright powered Fairchild "41" monoplane

lower longeron by a streamline strut Gasoline tanks are contained in the wing stubs and the landing gear shock absorbing struts are attached at the outer apex of the triangles The wing panels fold backward, hinged at the rear spar and, in order to fit them close to the fuselage, flaps are provided along the portions of the trailing edges not occupied by the ailerons When extended the wing panels are braced by a single broad strut from the bottom of the fuselage and are locked securely to the front of the wing stubs by a hinge pin actuated by an operating handle A padlock attached to the rear spar releases the operating handle and at the same time releases the locking handle on the wing flaps, which are swung upward and rest on the upper surfaces of the wing panels when the wing is folded The mechanism is so designed that the visible padlock cannot be locked until the wing panels and flaps are in their proper positions and guides and catches are provided to assure perfect alignment before the hinge pin is placed in position. It is said that the wings can be folded by one man alone in 45 sec

A Gottingen 387 Airfoil Section

The outer panels of the wing are of conventional wood construction with spars consisting of two solid planks of spruce laminated together, forming a solid beam 6 in. deep and 1⅛ in thick. Ribs are of spruce with plywood gussets Heavy wood compression ribs and double wire bracing produce a high degree of rigidity The leading edge is reinforced by extra ribs and covered with sheet duralumin in the structure The ailerons are balanced and differentially operated and extend through two-thirds of the semi-span at the trailing edge of the wing The inner one-third of the trailing edges of the wing panels constitute the flaps An aileron area of 29 sq. ft is provided for a wing area of 200 sq ft Both flap and aileron structures are built up of riveted Alclad and covered with fabric as in the case of the wing structure. Ailerons and flaps on each panel are interchangeable The angle of incidence of the wing is 0 deg and the dihedral 1½ deg. A Gottingen 387 airfoil section is employed

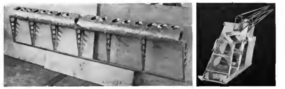
Another interesting feature in the Fairchild 41 is the construction of the wing struts In most planes of this type two independent struts are used on each side, one being attached to each spar In the new Fairchild plane a single built-up strut is employed and consists of two duralumin channels, 3 in. deep, braced to each other to form a truss The main members of this strut meet at the lower end and are approximately 18 in. apart at the upper end The entire unit is covered with fabric in streamline form This strut is attached by a screw adjustment to a heavy duralumin cross truss between the wing spars The point of attachment at the lower end is directly below the rear spar This arrangement produces an unusually clean external bracing system and eliminates the drag caused by interference of one strut upon the other in cases where two are used. It also results in a saving of more than 50 lb of weight over the usual type of bracing employing two steel struts



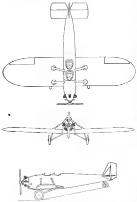
Three view drawing of the Fairchild "41."

Welded chrome molybdenum steel tubing with reinforcing plates of the same material at the joints constitutes the fuselage structure Important fittings are alloy steel forgings and are bolted in place with taper bolts Accurate location of fittings is obtained by the use of a master jig, making wings and landing gear interchangeable with any fuselage The two wing strut fittings on either side of the bottom of the fuselage are connected together by a steel tie rod which passes through the fuselage tubing and has a tensile strength of 12 tons The engine mounting is an integral part of the fuselage The fuselage cross tube directly behind the instrument board is made of special non-magnetic steel so as not to affect the compass

Wood fairing is used on the fuselage structure and windows and doors are a part of this fairing The completed structure is covered with fabric and doped. Flooring, controls, seats and other units are made up as separate assemblies and bolted in place.



Skeleton view of a "41" aileron and the method of Fairchild aileron attachment.



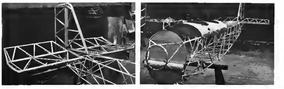
Three view drawing of the Fairchild "21."

Construction of the tail surfaces is similar to that of the Fairchild 21 and elevators and rudder are unbalanced The front edge of the fin is adjustable on the ground The fin does not telescope into the tail post, but is bolted to the top of it This construction has been adopted so that the fin will not rust tight in the fuselage.

The stabilizer may be set rigidly in any one of three positions and the screw adjustment in flight acts on the elevator instead of on the stabilizer The screw adjustment operated by the elevator applies a load, by means of steel cross springs, to the elevator cross shaft and so takes the load off the control stick The adjustment is controlled by an irreversible micrometer screw and the entire mechanism is independent of the normal elevator control and imposes no strain upon it This device has the same effect on the balance of the plane as the usual stabilizer adjustment, the principal advantage being that its use permits rigid attachment of the stabilizer to eliminate tail flutter The mechanism is actuated by a crank at the left of the pilot's position and a very accurate adjustment is possible because of the irreversible screw thread and the absence of catches or other devices to retain the adjustment

No pulleys are used in the control system The rudder cables run directly to the horns, passing under the cabin floor and are fitted with fiber guides where required The aileron control is operated by a torque tube running from the base of the control stick to a point under the cabin floor where it is possible to run cables directly up the wing struts to the wing, where there are bell cranks and push pull rods to actuate the ailerons Cables for the elevator control pass through the aileron torque tube and one of these is attached directly to the bottom of the stick The other cable is attached to a small link which operates in the opposite direction from that of the operation of the stick Elevators are operated by push pull rods from the cross shaft which is inside of the fuselage Brakes are operated by tension cables running on bakelite pulleys

The result of this unusual control system is that there are no exposed wires or levers in the cabin eliminating the danger of objects accidently jamming the controls. Dual flying controls are standard equipment and dual throttle and brakes also may be furnished The control stick, which is made of duralumin so as not to affect the compass, is located between the two front seats and somewhat forward of them An extension makes it possible for the occupant of either seat to fly the airplane The extension reaches above the pilot's knee and terminates at the usual position Brakes are operated by the pilot's



The tail assembly and fuselage structure of the Fairchild "21" training plane.

heels and it is not necessary to remove the toes from the rudder stirrups when applying the brakes

The instrument board is compact and all instruments are mounted in a small metal panel finished in crackle lacquer to match the upholstery and occupying the central one third of the board The space on either side of the panel and directly in front of the two seats is upholstered in leather, with a five inch thickness of soft padding behind the upholstery Arrangement of the instruments has been especially developed through cooperation with the Pioneer Instrument Co and compass, air speed indicator, altimeter, tachometer, oil thermometer and oil

Showing method of strut attachment on the Fairchild "41" cabin monoplane

pressure gauge are included as standard equipment Provision has also been made to add a clock, turn and bank indicator and other instruments if desired All of these units are of the small dial type and are flush mounted including the compass On the pilot's left are the usual engine controls in an aluminum casing together with ignition switch, gasoline valve and primer

The cabin, which is 4 ft 1 in high, 3 ft 2 in wide and 7 ft. 11 in long, is entered through doors on either side These doors are strong and are fitted with triple locks Upholstery is in two tone leather and broadcloth and behind this is a thick layer of kapoc sound proofing material Grained walnut is used for interior trim The rear seat, which is continuous across the back of the cabin, is equipped with deep Marshall spring cushions and upholstered in leather Behind this seat is a baggage compartment large enough for four suit cases and under the seat is a locker for tools and other equipment The individual front seats are of metal and also are fitted with Marshall spring cushions and have storage space beneath them. Fore and aft adjustment is provided for the pilot's seat and the other front seat can be reversed so that its occupant faces aft

Non shatterable glass is used in the windshield and forward windows and the window beside the pilot's seat is fitted with an automobile type regulator by which it may be raised and lowered A ventilator and floor heater are standard equipment The floor is carpeted and safety belts to match the upholstery are provided for all seats

The general design of the cowling is somewhat similar to that of the Fairchild 21, which was previously described, and includes a recess for the exhaust manifold which is of the collector ring type The exhaust is carried off in a tail pipe under the fuselage and all of this piping is recessed in the fuselage fairing although separated from it by an air space and a metal wall Incorporated in this tail pipe is the new silencer recently developed after long research by the Fairchild company

A Hamilton wood propeller with spinner is standard equipment but a metal propeller also can be furnished as extra equipment An Eclipse hand-inertia starter is also standard equipment together with a primer and carburetor heater. Fuel is carried in two 25 gal. tanks built into the fixed triangular wing stubs on either side of the fuselage and feeds by gravity to the carburetor None of the gasoline is carried over the occupants' heads or in the folding portion of the wings The fuel capacity can be nearly doubled however by adding two tanks in the folding portion of the wings

Gasoline lines are attached at both the front and rear of each tank so that no gasoline can be trapped in the tanks. A selective valve of the Air Service type located on the fire wall permits drawing of fuel from either tank From this valve it passes through a strainer and water trap before reaching the carburetor One gauge is fitted to each tank and is located inside the cabin above the window Each gauge consists of a bakelite tube containing a cork ball floating on the surface of the gasoline This device is simple, dependable and in complete view of the pilot

Landing gear is of the split axle type having a tread of 10 ft and shock absorbers are of the oil and spring type having a total travel of 10 in, the first 6 in of which is cushioned on oil alone The remaining 4 in is on oil and spring and is used for taxiing As in the case of the Fairchild 21, the plane is equipped with a tail wheel mounted in the same way as that of the smaller plane The shock absorption is accomplished by means of rubber cords installed without initial tension and the entire mounting unit is placed in a separate water tight compartment in the fuselage which prevents mud from collecting in other parts of the fuselage The tail wheel is fitted with a 14 x 3 in tire and the deflection in landing is 5 in in addition to the cushioning of the tire

Floats Can Be Installed on the "41"

Standardized floats can be installed to replace the landing gear of the Fairchild 41 when the plane is to be used as a seaplane These floats are so designed that they can be attached to the same fittings on fuselage and wing stubs as the regular landing gear The time required to replace the landing gear with floats is said to be approximately 3 hr For winter flying, skis may be installed in place of the Bendix disc wheel and brake units which are standard equipment The tire size is 30x5 in

The specifications of the Fairchild 41 as furnished by the manufacturer are as follows:

Wing span	36 ft
Span (wings folded)	12 ft. 6 in.
Length	25 ft
Height	8 ft
Wing area	200 sq ft
Airfoil Section, Gottingen	387
Aileron area	29 sq ft
Elevator area	11 6 sq ft.
Stabilizer area	16 7 sq ft
Fin area	4 sq ft.
Rudder area	7 2 sq ft
Weight empty	1,780 lb
Disposable load	1,220 lb
Gross weight	3,000 lb
Power plant, Wright J-5	(200 hp at 1 800 r p m)
High speed	130 m p h
Cruising speed	(1 650 r p m) 108 m p h
Landing speed	49 m p h
Initial climb	720 ft per min.
Climb in 10 min	5,350 ft.
Service ceiling	12 400 ft
Cruising range	(1,650 r p m) 500 mi.

Seeding *of* Waste Lands *by* Airplane

By CHARLES V STANTON

RECLAMATION of thousands of acres of now idle and useless land in the Pacific northwest, and the development of a new and profitable field for the commercial use of the airplane is promised by a series of experiments being conducted in Southern Oregon where "logged-over" lands are being seeded and converted into stock ranges through the use of planes By cutting the cost of seeding to nearly one-half that of the older methods, airplanes promise to open up a field that has almost unlimited possibilities in the logging districts of the country and in the grain-producing areas

The recent tests made in Southern Oregon have proved beyond all question that the airplane may be used very satisfactorily and efficiently in sowing grass seed over land that otherwise would be absolutely valueless The experiments are being closely watched by the U S Forest Service, the Oregon State Agricultural College and by stockmen, who are becoming very enthusiastic over the possibilities of this new use for the airplane Future experimentation will undoubtedly lead to the extension of airplane seeding methods, giving an additional source of revenue to plane operators

While all work attempted so far has been in the way of handling range grass seed, it is not at all improbable that methods will soon be devised for distributing wheat from the air to seed the great wheat fields of the northwest and Canada, and, if this can be done on a basis proportionate with the saving that has been effected in sowing logged over lands, the use of the airplane in seeding operations in future years is definitely assured

Thousands upon thousands of acres of logged over lands in Oregon, Washington and parts of California may be restored to usefulness by this new method, affording not only profit to airplane operators but giving room for the expansion of the sheep industry, through availability of additional ranges

Barren Wastes Remain

In logging operations, it has been the practice to remove the merchantable timber from the land, leaving undesirable trees upon the ground After the timber wanted for lumber is removed, the tracts are left covered with logs, snags, limbs and other debris which is allowed to dry and is then burned These slashings, often covering thousands of acres burn with an intense heat, destroying all of the vegetable matter in the soil, and leaving the land barren and useless, a hideous waste of charred logs and half-burned stumps

Most of this land, being in rough mountainous country, does not have sufficient agricultural value to warrant the expense of clearing It is usually on steep hillsides, isolated, and with shallow soil, incapable of supporting agricultural crops

Part of the Clark Wilson Co original timber stand near Globe, Ore

It does, however have a very potential value as range land for sheep or cattle, but must first be seeded with the type of grass best adapted to it Seeding by hand has been too slow and too costly for general use and has been employed only where conditions were ideal Stockmen have long been seeking some method whereby this land, which they can buy, or lease at a very low price, can be economically converted into suitable ranges, and it has remained, apparently for the airplane to furnish the satisfactory solution to this problem

The first experiments in seeding logged-over land from an airplane were made by Harold R Adams, Southern Oregon Travel Air distributor, who maintains headquarters at Roseburg, Oregon Lieutenant Adams, who, following his wartime service took up aviation commercially, spent several months conducting a series of tests before accepting the first contract, which called for the seeding of 1 200 acres of land in the Coos Bay district for a newly organized corporation that planned to develop a range for 5,000 head of sheep

The most difficult part of the experimentation was the development of a hopper suitable for distributing

the seed. Mr. Adams used a Travel Air biplane of the open cockpit type for this work, placing the hopper in the front cockpit, with a spout equipped with a spreader device built through the bottom of the fuselage. The spout was equipped with a shut-off valve operated from the pilot's seat. It required a good deal of test flying to determine the size of the opening, as it was necessary to take into consideration the amount of ground to be covered, the width of distribution and the speed of the plane. The whole plan was worked out along original lines, following a preliminary survey by the pilot, who flew over the tract after the boundaries had been marked out, so that they would be visible from the air.

A temporary field was established about five miles from the tract to be seeded and the work was started. On most of the area seeded the ground was gone over twice, the second time at right angles to the first. A man on the ground checked the distribution of the seed and

Loading seed into the hopper of the OX-5 powered Travel Air biplane

signalled the operator where it was necessary to go over ground that had not been reached on the first flights. A rather unique method was used in checking the distribution of the seed. Rolls of sticky paper, 10 ft. in length, were spread out upon the ground at various points of the tract, catching the seed as it fell and giving a general idea regarding the thoroughness with which the ground was covered. Smudges were built at intervals to show the drift of the wind and were also used for signals between the ground observer and the pilot.

The first experiment resulted in securing a great deal of very valuable information, and led to the success met with in later tests made on much smaller tracts, some being only from 100 to 200 acres in size.

The seeding flights have been found quite hazardous. In the first place, the territory covered, as has been stated, is rough and mountainous in character. It is covered with debris of all kinds so that a forced landing is almost sure to mean disaster. Usually it is at considerable distance from the temporary landing field established as a base for operations. Flying must be done at low altitude in order to avoid the effect of the wind in carrying the seed. The gulches, draws and ravines create numerous cross currents that keep a pilot constantly upon the alert.

Altogether the work requires a great deal of flying skill, for in addition to meeting the flying hazards, the operator must fly his plane in such a manner that the bands of seed as he distributes them are parallel, without too much gap or overlap. Flying across a field at an elevation of from 250 to 500 ft. and at a speed of from 75 to 80 m. h. p., cutting off the flow of seed at the boundaries and keeping the distribution uniform, is a task that requires much skill and experience.

Heat of Fire Loosens Soil

Several important facts have already been learned from the experiments made. One of the most important is that the seeding is most effective if it follows immediately after the fire that burns through the slashing. The heat causes the soil to become loose and porous, and it is covered with ashes, so that the seed finds a much better bed than is the case after rains have beaten down the surface. It has also been learned that the work can best be done on damp, cloudy days as there is usually less air movement. There is still much to be learned and to be worked out by future tests. The style of hopper to be used is one of the most essential factors. The seed falling through a small opening is scattered by the propeller blast, so that it falls over a wide strip below the plane. In handling heavier seeds, however, such as wheat or other grain, the rate of fall is much more rapid

Left—Immediately after the slash burn. Booth Kelly logging area. Right—A few years after logging.

Left—Wind River logging area in 1924. Right—After slash burn near Globe, Ore.

and the distribution is not so wide. This will require a hopper that will scatter the seed over a wider area by some mechanical means.

While some tests have been made with grain seeds, the bulk of the experimentation has been with the lighter grass seeds. The English Rye, Alsace and White Clover form the favorite combination for range use. Clover, because of its widely different characteristics, is usually sown separately from the grass seeds.

Plane Seeds 150-200 *Acres Daily*

The comparison of costs between hand and airplane methods of sowing, easily shows why the airplane method is certain to be adopted in the future. In the first place, hand seeding on many of the tracts is almost prohibitive because of the nature of the terrain. Seed must be carried in by pack train, and must then be taken out in bags by the sowers, who must pick their way over fallen logs, stumps, rocks and numerous obstacles, making it practically impossible for them to cast the seed evenly over the entire tract. Then, too, they can carry only a comparatively few pounds of seed, so that they spend the greater part of their time walking to and from the source of supply. However, the time involved is the chief factor in favor of the airplane seeding method. An expert seeder, under the most favorable conditions, cannot seed more than 5 to 8 acres of logged over land in a day's time, and it may easily be seen that the task of seeding several thousand acres by this method is very slow. The airplane seeds from 150 to 200 acres daily. The labor costs, not including the materials used, in the hand method vary from 75¢ to $1.25 per acre, depending upon the conditions. The costs involved in seeding by airplane, including gasoline, oil, pilot's time and other operating costs, are from 40¢ to 60¢ an acre, depending largely upon the distance of the landing field from the tract. The amount of seed carried depends, of course, upon the capacity of the plane.

The saving in materials is also very considerable. A hand seeder uses from 10 to 12 lb. of seed per acre, while the airplane uses from 6 to 8 lb. As the seed used has a wholesale cost of from 30 to 35¢ per pound, it is evident that the airplane method of seeding is by far the more economical.

The U. S. Forest Service has been making a very careful check of the results of these experiments, as the grazing program is one of the important parts of forest management. In checking the results of the work done in Oregon, the Forest Service learned that the stand of grass over the entire tract is heavier than is usually obtained by hand sowing, despite the fact that there was less seed used. It was found that the seed had been distributed in a far more uniform manner than would have been possible under the former methods and that places were reached where hand cast seed would never have fallen.

How far the airplane method of seeding can be expanded is a matter largely of experiment to determine its effectiveness. It has been proved that the plane can sow the seed more evenly, and in far less time than existing methods, and at a lower cost. Its use in converting

Section of Clark Wilson area near Globe that has been successfully seeded

logged-over lands into profitable ranges has been amply proved, but it is not known whether it can supplant the methods now used in sowing the great grain fields. If some such plan can be worked out in the future, the owners of the ranches will be saved many thousands of dollars that they now have invested in expensive machinery and equipment, for any ordinary commercial plane can quickly be equipped for seeding purposes and can then be restored to its usual commercial pursuits.

The Verville "Air Coach"

New Warner "Scarab" Powered, Four Place, Semi-Cantilever, Cabin Monoplane is the First of a Line of Small Craft

By JOHN T. NEVILL

IN the "Air Coach," a four-place, semi-cantilever, cabin monoplaoe, recently built and flight tested by the Verville Aircraft Co, of Detroit, Mich, the company has a plane that promises to be well worthy of the reputation of Alfred V Verville, its designer Mr Verville, an aeronautical engineer of many years' international standing, is secretary of the company B F Everitt is president and general manager The Air Coach, according to Mr Verville, is the first of a line of small planes and flying boats the company expects to produce

Generally speaking, the Air Coach is similar in appearance to other semi-cantilever, cabin monoplanes of its size, although its construction embodies a number of very worth-while and highly original features Chief of these, probably, is an entirely new type of fuselage structure, eliminating fuselage truss tubes intersecting the side windows, and making possible a visibility found in few other cabin planes of its type A patent on the system has been applied for, according to Mr Verville

Another feature, somewhat original, is two short streamlined sponsons, or stubs, semi elliptical in plan-form and 16 in in length, projecting horizontally from the lower longerons To these the forward wing struts are attached The principal function of the stubs, however, is to serve as an attachment unit for the Aerol shock absorbing struts on the landing chassis By attaching the wing struts in this manner it is claimed that parasite resistance is reduced, as compared with the conventional type of strut bracing now in vogue The landing gear shock struts are attached at the outmost point of the stubs allowing a seven foot tread in the carriage The stubs, or "fins," as they might be called, also serve as small compartments, 8 in. deep, with hinged doors on their upper surfaces One of the compartments will be used for the plane's battery; the other for tools, thereby making possible more room in the already spacious cabin

Other distinctive features in the Verville Air Coach include a rudder streamlined into the fuselage, an especially designed hand-brake control, allowing for easy braking of either wheel alone, and a tail-wheel, equipped with full caster Aerol shocks, and built "into the fuselage," to decrease drag These features will be discussed in more detail later

Mr Verville, with a wide experience in designing racing aircraft, has succeeded in combining many of the speed producing characteristics of the racer, with the convenience and comfort of modern cabin planes Furthermore, he has emphasized the trim lines of the plane with a color scheme of red, silver, and black, enhancing the appearance to a considerable degree

William S Brock, who test flew the Air Coach at Fordd Airport, said it developed a high speed of 110 m. p h and had a landing speed of 45 m p h. with the 110 hp, seven-cylinder, Warner engine with which the present plane is powered It will attain 125 m p h. with a five-cylinder, 150 hp Wright "New Whirlwind," or 140 m p h with a seven-cylinder, 225 hp "New Whirlwind," Mr Verville estimated The Air Coach will be offered with any of the three engines mentioned Mr Brock was enthusiastic over the craft's stability and control.

Wings of the Air Coach are 40 ft in span, and of conventional wood construction employing a Clark Y airfoil section They are attached to the fuselage at the cabin

A side view of the Verville "Air Coach" a four-passenger, semi-cantilever wing cabin monoplane

with fittings of the Trunnion type The two panels have a uniform chord of 6 ft 6 in, giving the wings an area of 250 sq ft The wing has no incidence, and at present is rigged at 1 deg dihedral Wing strut adjustment screw terminals, at the top of the struts, will allow a dihedral angle of from zero to 3 deg Tips of the wings are slightly curved and equipped with navigation lights The total aileron area is 26 sq. ft

Double drag bracing is employed in the wing structure internal drag struts being of steel tubing Aileron hinges are attached to triangular tubular frames, which, in turn, are attached to the rear spar at four drag stations, making a total of four aileron hinge supports The leading edge of the wing is covered with Alclad Gasoline tanks are of welded aluminum, elliptical in section, making for maximum strength and reduction in possible leakage hazard The tanks each of 25 gal capacity are cradled with two steel straps, insulated from the tank proper by felt strips

Ailerons are of the Frise type and are operated by push and pull control tubes All control hinges throughout the plane are fitted either with bronze or Bound-brook oil-less bearings Wing struts are of streamlined dural aluminum tubing, the after struts being attached to the lower longerons, well forward of the two side doors, and in line with the fuselage cross member to which the fuselage drag struts of the split type landing chassis are also attached Viewed from the side this arrangement contributes much of the simplicity of construction that is characteristic of the entire plane

The wings are covered with Fighlex and surface treated with Berry Brothers pigmented dope the upper side being black and the under side red Struts are painted silver

The overall length of the Air Coach is 28 ft Aside from the wings, the structure is built entirely of chrome molybdenum steel tubing of various sizes, trussing of the fuselage aft of the cabin being of rigid diagonal tubes The tail surfaces, like the ailerons, are framed with metal tubing Tubing throughout is oiled inside and lacquered outside

From the point where the top of the cabin is almost flush with the wing's upper surface, the "back" of the plane slopes gracefully aft, its height above the wing at the trailing edge being about 3 in From a point near the after wing strut the bottom of the fuselage graduates upward in a similar curve, the two curves being carried across the streamlined lower portion of the rudder and meeting at the outboard end of that member By streamlining the rudder with the fuselage, Mr Verville has employed a feature in modern commercial craft that he utilized to advantage years ago in racing designs

From a point directly over the control wheels and flush with the wing's leading edge, two truss members slant forward at an angle of 45 deg and slope inward to where they meet the framework leading to the nose of the plane The nose is lean and bullet-shaped, the Warner engine being set well forward and nicely streamlined into the cowling A spinner is employed, which intensifies this bulletlike effect

A detachable engine mounting of the ring type and a cowling similar to an automobile hood is used The cowling is stoutly clamped with Verville fasteners, and is easily removable Including the cowling, all covering of the fuselage forward of the doors, is aluminum

An interior view of the cabin of the Verville "Air Coach"

The engine is fed by gravity and lubricated from a 5 gal oil tank, located in the fuselage, forward of the cabin Gasoline feed lines, of ½ in copper tubing, are equipped with Air Service three-way valves Gas capacity gauges, of the magnetic type, are suspended from the wing tanks on each side A firewall is provided to reduce fire haeard

On the initial and experimental plane no exhaust collector ring has been installed, although this, a silencer, heater, and cabin ventilator will be standard equipment on the production models Exhaust will be carried off under the plane, according to the common practice

Similarly, a Heywood starter is installed on the present model, but this, it is understood, will be interchangeable with the Eclipse type on later, or higher-powered products A Standard steel propeller, 8 ft in diameter, completes the power plant

The landing chassis, as previously stated, is of the split axle type Disc wheels, with faired hub caps, and fitted with 28 in by 4 in Goodrich tires, are used The disc tail wheel, also employing an Oleo shock absorber, carries a 14 in by 3 in tire of the same make The main wheels are fitted with Bendix brakes Landing stress is distributed through tubular pyramid trussing between the two wing stubs.

The balanced rudder has an area of 9 sq ft It is fastened to the vertical fin by two hinges equipped with oil-less bearings Elevators and stabilizers are built in two parts, both front and rear spars of the stabilizer being fastened on two fuselage stub spars by means of two bolts The elevators have a total area of 14 sq. ft, that of the stabilizer being 20 sq ft, while that of the fin is 4 sq ft Right and left elevators and right and left stabilizers units are interchangeable.

The stabilizer is equipped with an adjustment device, having a range of from 0 to 5 deg, plus and minus This device may be operated from the cabin A 24 in by 10 in handhole is provided in the fuselage for inspection and adjustment of the tail wheel assembly and the stabilizing adjustment assembly The cover of the handhold is fitted with four cinch fasteners The entire tail wheel assembly may be removed through the bottom of the ing adjustment assembly The cover of the handhole is all control cables are concealed

The cabin of the Air Coach has a minimum length of 8 ft and a maximum length of 10 ft. the after 2 ft.

being used for storage purposes The height of the cabin is 4 ft, or the same as the average sedan automobile Also there is an average width of 39 in Displacement capacity in the cabin is figured at 126 cu. ft. Control wheels are mounted on upright columns, designed to make easily possible either dual or single control. The control columns are of the torque drive shaft type, with a spline connection at their base. For purposes of safety and convenience either column may be disengaged by unscrewing a knurled nut Either column may be removed without disturbing the functioning of the controls.

Brake Lever is Conveniently Placed

Between the two forward seats is the braking lever To brake the left wheel the lever is pulled to the left exactly like the operation of a control stick The reverse, of course, is true when the opposite brake is to be applied To apply both brakes simultaneously, and for locking the wheels, it is only necessary to press on the ball and pull the lever straight back.

Standard equipment on the dash includes a turn and bank indicator, climb indicator, compass, air speed indicator, oil pressure gauge, oil temperature gauge, altimeter, clock, instrument lights and all light switches, and a Scintilla magneto switch Except for the magneto switch, all of the plane's instruments are Pioneer, and nicely centered on a 27 in by 9 in crackle varnished duralumin board The throttle is of the push and pull type

As previously stated, the cabin has a large expanse of unobstructed vision, both on the front and sides Pittsburgh shatter-proof "Duplate" glass is seated into the windows by a method similar to that used in automobile body construction The side windows slide back and forth, easily converting the plane into an open type Two doors, also fashioned after those of the automobile, are located abreast of each other aft of the two rear seats, allowing easy ingress and egress Two large skylights fitted with green pyralin, are set in tandem in the cabin roof, between which is the cabin's electric light On the back wall of the cabin is a door, 18 in by 12 in in dimensions, and equipped with cinch fasteners for inspection of the tail section

The four seats in the cabin are bolted to the tubular structure of the fuselage All upholstering is of Laidlaw's broadcloth, red below the belt-line and gray above it, except for the seats, which are entirely red A mat of woven automobile type is laid over the floor There are four pockets, one on each door, and one on each side wall forward of the doors Ternstedt hardware is used throughout the cabin

The plane is colored entirely in three shades, red, silver and black The shades on the wings and wing struts have been described An aluminum moulding extends along the "belt line," from the engine cowling to the beginning of the rudder All of the fuselage, from the propeller to the door handles, both above and below the belt, is red, except, of course, the engine From the door handles aft the ship is red below the moulding and

A view of the tail group of the Vervillc "Air Coach" showing position of the tail wheel

silver above it, excepting for a conical shaped portion pointing back between the belt-line and the trailing edge of the wing, which is red

The horizontal tail surfaces, like the wings, are black above and red below All that portion of the vertical members above a point in line with the moulding, is silver The spinner, also, is silver, as are the landing gear braces and struts Hub caps are red

Complete specifications of the Air Coach, as furnished by the manufacturer, follow:

Wing span	40 ft
Length overall	28 ft
Height overall	7 ft
Wing area	250 sq. ft
Aileron area	26 sq. ft.
Elevator area	14 sq ft
Stabilizer area	20 sq ft
Rudder area	9 sq ft
Fin area	4 sq. ft
Incidence	0 deg
Weight empty	1,525 lb
Normal gross weight (loaded)	2,400 lb
Disposable load	875 lb
High speed (with Warner)	110 m. p. h
Landing speed	45 m p h
Fuel capacity	50 gal
Cruising range	600 mi
Sale price	$7,500

A front view of the Verville "Air Coach" showing the method of attachment of the shock struts

The Overhead Expense of Direct Labor

By Edwin R. Douglas
Consulting Engineer

OVERHEAD expense is made up of general items which cannot be allocated directly to the cost of any individual pieces, or products Nevertheless each item does represent some service necessary to production, administration, or sale These services are of many varieties, and the different products often require them in widely varying amounts. When these are thrown into a common overhead and apportioned at a uniform rate over all products, the resulting distribution may be quite different from what it would be if each overhead item were seperately distributed on the basis of service rendered By the latter plan if it were practicable, the resulting costs would be in accord with the facts and, therefore, strictly correct, which, in general, by any other method they cannot be Since a separate distribution is not practicable, it has been necessary, in the interest of better costs, to find methods that will approximate to the same results These have been found in "departmental burdens" and in "machine tool rates"

Manufacturing organizations of any size are always divided up into departments This division may be on the basis either of function, such as the press department drilling department, etc, or of product, such as engine department, fuselage department, etc The first type is more usual in shops making a variety of products, the routing of which may differ, the second, in shops making but a few fixed lines, although if the latter be large, they may be further departmentalized according to function In addition to those departments which work directly on the products, there will be others which furnish different kinds of service, such as the power department maintenance department, purchasing department, cost department etc

All these departments should be—and easily may be—arranged so that every item of overhead expense may be allocated to some definite department There will, of course, be many items of expense that can be taken directly to one, or another, of the productive departments Such items would be the departmental supervision, supplies, and many items of maintenance The other and more general items will all be charged to one, or another of the indirect or service departments and these should be planned with that in view There should be no item that has to be classed as "general" or "miscellaneous" If such appear necessary, it means that there must be a general, or miscellaneous department—more usually called "administrative" or "executive" It is usually necessary to have also a "buildings department," and often a "grounds department," to which certain otherwise general items may be charged

It is the purpose of these "indirect" departmental divisions to collect the expense of each kind of service under one head, for re-distribution to the "productive" departments in proportion to the service rendered to each Different kinds of services, such as those rendered by the administration and by the grounds, are rendered to different productive departments in very different proportions, and no just division can be made if they are all classed together as "general"

When the departments of the organization have been laid out in the manner described, then all items of indirect expense coming through from that time on must be allocated to them—each item, as it occurs, to its proper department The proper item to make this allocation is when the expense item is being authorized—when the purchase order for it is being approved, or the shop order for it is being issued—not some weeks, or months later when the original intention is more or less forgoten and somebody has to spend valuable time in an often vain effort to find what it was "all about" This is an exceedingly important rule, for it lies at the foundation of correct overhead distribution and that is that every expense item should be authorized, every authorization should show what department is to be charged with the expense, and that these charges should be put on the order initially, when it is being authorized

Arbitrary Division Possible

We now have our expense items all charged to departments—some directly to productive departments and the rest to "non-productive," or service departments Before these latter can be re-distributed to the former, we must determine in what proportions each kind of service is made use of by the former departments In some cases, this is simple, as where the service is the furnishing of space in a building and its expense is divided in proportion to floor space used and easily measured In other cases, is less simple, as in the use of steam distributed through pipes The amounts of steam actually used may not be at all in proportion to the sizes of the pipes or outlets; the only close determination, where good steam flow meters are not installed, is by catching and weighing, or measuring, the condensate over a period of time In still other cases, there is no practicable way to measure the service, or it would not pay to make a determination In these cases an arbitrary division may be made

In some cases, as that of floor space, the apportionment may remain unchanged month after month In others, like the distribution of maintenance department expense, it may vary continually as the labor of that department is spent in repair work, for various departments

For each service department, the basis for re-distribution of its expense must be found, either according to the way its labor has been spread, or on some measurable values or by an arbitrary division In practice, this is not so difficult, or laborious, as it may seem

Now, having these bases, we are ready and may begin

to make distribution of our service departments' expenses Before going far, however, we seem to strike a snag The service departments serve not only the productive departments, but some of them serve each other The power department supplies power to the maintenance department, the maintenance department makes repairs for the power department, and some of them even supply service to themselves After we think we have cleanly distributed all the month's expenses of some such department, we find another item being charged against it from some other distribution This has often proved a stickler for unskilled cost accountants There are three ways to get over, or around it The first is to make all the distributions once through, and then go over it again and redistribute these secondary amounts, and then a third time and a fourth time, and so on until finally the amounts become so small, less than one cent each, that they may be neglected This is an extremely laborious proposition, even where "millionaires," or other computing machines are available

Second Way More Simple

The second way appears to be more simple It is to make no re-distributions of expense against the service departments, to leave them out of the calculations and redistribute all of their expense against the productive departments only This is sometimes justified on the supposed principle that "no overhead should be charged against an overhead" There is no such principle, in fact, and this method is really based on ignorance and leads to error If the maintenance department uses power it should be charged with the cost of it, and if it does repair work for the power department, the latter should be charged with a share of the maintenance department's expense, and so in all such cases

The way around these difficulties is really very simple It is found by remembering that a distribution of departmental expense is really a credit to the original department and a series of debits to the departments receiving the distributions We are running a charge account with each department. If one has a charge account at a store, he may pay his account, fully at the end of every month; but if the storekeeper makes up his bills before closing time on the last day of the month the customer might make a small purchase after his bill was made out It would not appear on his bill, and would not be paid at that time. It would be charged to his account and be carried over to the next month, and paid then. So in these distributions, these secondary expense items, coming in after the expense of a department has been distributed, are simply allowed to stand as unpaid, or undistributed balances, and are carried over to the next month, when they are picked up with later items and are distributed No accounting error occurs, the books are always in balance, and no appreciable difference will appear in any month's costs The amounts carried over will always be small, and, while the amount will be omitted from this month's distributions, there were similar small amounts picked up at the beginning of the month, from the month preceding, to make up for it The "bugaboo" of expense re-distributions thus disappears

Where a department furnishes service to itself, the case is a little different If a department charges itself, it must also credit itself, and there is no net result That is, though a department may furnish some service for its own use this must be disregarded in making the initial distribution of its expense, and all of that expense must be distributed to other departments If, then, having done this, we wish to show a charge and an equal credit l the department to itself at the prevailing rate for the self-service rendered, we may do so, but this is no part of the original distribution

Now, except for the small net amount of the undistributed balances at the end of the month, less those which were brought forward at its beginning, we have distributed to the productive departments, on a reasonably equitable basis, all the expense of the service departments, and the expense of each productive department has been augmented by these additions In what way are we nearer to a solution of our problem, which is to carry the expense of the different services, in just proportions into the costs of the different products? We are quite a bit nearer All that remains is to distribute the augmented expenses of the productive departments into the costs of the productive work they do This is done most simply on the basis of their productive wages, or productive hours If, in a certain month, the augmented expense of a given department were $750, and its productive wages were $600, then to each dollar of productive wage might be added $1 25 to cover the expense The burden rate of that department during that month would have been 125 per cent If during that month they spent $80 in wages on one job, then the burden to be added to cover their overhead expense on that job would be $100 The total departmental cost of the job, exclusive of raw material, would be $180, and this would have absorbed not only their productive labor and their direct expense for supplies, supervision, maintenance, etc, but their share of the indirect expense for all the services of other departments used by that department True, this makes all the products of the department share the costs of those services in like proportions and this may not be the case in fact, but it is much nearer the fact than was a general distribution which took no note of departments and their special requirements In many cases, this is a very good plan

Of course, to get these figures for any month we must wait until all the costs and distributions and accounting for that month are finished, and this may be a week, or two or three, after the end of the month We cannot always wait so long. We may need to bill a customer on cost basis before the end of the month, and we always require a basis for distributing overhead in our estimates. Here, the answer is that we have to take a chance. If the burden rate for a department has held steadily to about one figure for sometime, and no change in conditions is anticipated, we may use that rate in estimates and costs If, due to varying conditions, the burden rate has fluctuated considerably, then we may judge what the conditions are likely to be and use a rate accordingly After the month is over and the figures are in we can see how close we came.

In most cases, there are so many costs that need to be known currently, or before the end of the month, that it is simpler to figure all costs on that basis We shall then, by this plan be charging the total costs of work in process with the actual costs of raw material and direct labor, and with departmental burdens to cover overhead expense at assumed rates By any plan of accounting, if work in process is charged, something must be credited, and this will be as follows:

Raw material . . . credited to . . . stores, or purchases
Direct labor . . . credited to . . . payrolls accrued.
Burdens . . . credited to . . . departmental burden accounts

After the end of the month the actual departmental expenses when known, may be charged to these same accounts Since exact agreement is not to be expected, there will always be differences between the burdens (credits) and the expenses (debits) These differences are amounts by which costs have been over-charged or under charged If our judgment has been good, the differences will not be great Some will be positive and

others will be negative. The net amount will be small and may itself be largely balanced by contrary amounts in other months This would be an ideal condition, seldom reached until the plan has been in operation for some time.

It is very desirable to have these differences tabulated month by month, in comparison with the total payrolls, hours, burdens, and expenses for each department, so that tendencies may be watched and large or growing differences corrected through the burden rates

It will be interesting to make some comparisons between costs and prices computed by the use of departmental burdens and those under similar conditions by a general burden rate By way of illustration, we will figure these burdens at rates per hour instead of the percentages on wages,

Assume two factories, "A" and "B," each having two departments, No 1 and No 2. The products, departments and costs in these factories are identical In both factories, the rate of wages is the same, say 40¢ an hour Department No 1 in each factory operates a total of 500 hr a week and department No 2, 200 hr a week. The actual overhead expense in these departments is the same in both factories, and as shown in the table

Department	Weekly Hours	Overhead Expense	Hourly Expense Rate	
No 1	500	$ 25 00	$0 05	} Used in Factory "A"
No 2	200	100 00	50	
Total	700	$125 00	$0 179	Used in Factory "B"

These rates, one ten times the other, would not be uncommon, and would apply, respectively, to hand work and machine work departments. Plant "A" is departmentalized and uses departmental burdens of five cents and 50¢ per hr. Plant "B" uses one general averaged rate of $0.179 per hr.

Assume for this illustration that a product is being made that takes four hours in Department No. 1 and four in department No. 2 Then the costs in these two plants will be as follows:

Department		Factory "A" Hours	Rate	Wages	Burden	Factory "B" Hours	Rate	Wages	Burden
No. 1	Wages	4	40	$1.60		4	40	$1.60	
	Burden	4	05		$0.20	4	179		$0.716
No. 2	Wages	4	40	1 60		4	40	1.60	
	Burden	4	50		2.00	4	179		.716
Total Wages				$3.20				$3 20	
Total Burden				2.20	2.20			1 43	1.432
Raw Material				$5 40				$4 63	
				3 00				3 00	
Factory Cost				$8 40				$7 63	
Selling Expense at 15 per cent				1 26				1 15	
Admin Expense at 10 per cent				84				76	
Cost as Sold				$10 50				$9.54	
Profit at 10 per cent				1 05				96	
Selling Price				$11.55				$10 50	

Although the costs in these two factories are actually the same, we have a selling price of $11 55 in the first factory and of $10 50 in the second The apparent difference is just a matter of figures on the books. Nevertheless, "B," with estimated factory cost of $7 63 and selling cost of $9 45, which is really his cost, and will have no real profit, although he thinks he is making 96¢

We will now modify this case a little and assume that, instead of taking four hours in each department, the goods take only three hours in No. 1 in both plants, but take five hours in No 2 The costs hours being the same, the costs will be as follows:

Department		Factory "A" Hours	Rate	Wages	Burden	Factory "B" Hours	Rate	Wages	Burden
No 1	Wages	3	40	$1 20		3	40	$1 20	
	Burden	3	05		$0 15	3	179		$0.537
No 2	Wages	5	40	2 00		5	40	2 00	
	Burden	5	50		2 50	5	179		895
Total Wages				$3 20				$3 20	
Total Burden				2 65	2 65			1 43	1 432
Raw Material				$5 85				$4 63	
				3 00				3 00	
Factory Cost				$8 85				$7 63	
Selling Expense at 15 per cent.				1 33				1 15	
Admin Expense at 10 per cent.				88				76	
Cost as Sold				$11 06				$9 54	
Profit at 10 per cent				1 11				96	
Selling Price				$12.17				$10 50	

The selling price for factory "A" has increased to $12 17, but in factory "B," it remains the same, because they are using a general or average burden rate and, since the total hours are the same, it makes no difference how it is distributed, for the same figure results "B" would sell at $10 50 and suppose he was making a profit of 96¢ As a matter of fact, his cost is $11 06, the same as "A," and he is losing 56¢.

As a third example, assume that the goods take eight hours in department No 1 and do not go through No 2 at all. The costs will then be as follows

Department		Factory "A" Hours	Rate	Wages	Burden	Factory "B" Hours	Rate	Wages	Burden
No 1	Wages	8	40	$3 20		8	40	$3 20	
	Burden	8	05		$0 40	8	179		$1 432
No 2	Wages	0		0		0			
	Burden	0			0	0			0
Total Wages				$3 20				$3 20	
Total Burden				40	40			1 43	1 43
Raw Material				$3 60				$4 63	
				3 00				3 00	
Factory Cost				$6 60				$7 63	
Selling Expense at 15 per cent				99				1 15	
Admin Expense at 10 per cent				66				76	
Cost as Sold				$8 25				$9 54	
Profit at 10 per cent				83				96	
Selling Price				$9 08				$10 50	

"A" can sell at $9 08 and make a profit, but "B" still shows a price of $10 50 If he does cut and get down to $9.08 he has to go below his apparent cost He has, supposedly, to lose money in order to get the business, and yet, as a matter of fact, his costs are no higher than "A's," and he would actually make the same profit of 83¢ by selling at $9.08

It may be said that these examples are "fixed up" to fit the argument, and, of course, that is a fact, but there is nothing about them out of the ordinary, or which might not be found in almost any factory. They show the sort of error that may be made through the use of a flat uniform burden rate, and the confusion that may result in an industry when some of the members cling to incorrect methods of cost figuring The uniform burden rate on labor is a great advance on the old "blanket" rate on bare cost, as was shown in the preceding article, but it is not good enough for figuring costs in competition Nothing less than departmentalized burdens can meet this situation

In his next article, which will appear in an early issue, Mr. Douglas considers modern refinements on even the department burden rate, as expressed in the machine-hour rate After an examination of the changes in expense and burden rates caused by fluctuations in volume of business, he takes up the matter of fixed and variable overheads and their bearing on prices and profits under certain business conditions

Law Makers Face Aviation Bills of Benefit to Industry

Congress and Many State Legislatures Consider Wide Variety of Measures

Now the legislative halls of the country, federal and state, are echoing the hum of aeronautical affairs. Numerous bills affecting the industry have been sponsored in many parts of the country, ranging from federal rating of flying schools to boosting the construction of airports.

Sen. Hiram Bingham, president of the National Aeronautic Association, has introduced a bill in Congress seeking to amend the Air Commerce Act of 1926 with provision for annual official examination and rating of aeronautical schools in the same manner the Aeronautics Branch now rates airports and licenses planes and pilots. The plan is to distinguish between the schools as to adequacy and competency of equipment, methods and teaching staff.

The bill appears to be in line with the efforts of a committee of the Aeronautical Chamber of Commerce to raise and better define the standards of flying schools throughout the country. Another federal bill would provide $1,000 to cover expenses of 3 delegates to the First International Congress on Sanitary Aviation to be held at Paris May 15 to May 20.

Demonstrations Planned

The congress will discuss 1, Sanitary aviation in the colonies; 2, sanitary aviation, a means of evacuation in time of war; 3, sanitary hydro-aviation; 4, the Red Cross and aviation; 5, medicine and aviation; 6, aerial physiology, and, 7, sanitary aviation in peace. The delegates will be given a demonstration at the Bouget Dugny airdrome of the sanitary planes in use or projected and on the coast will be shown the sanitary planes of the national marine.

Another bill has been introduced authorizing the postmaster general to contract for air mail service on routes between the United States and possessions of the United States, between possessions of the United States, between the United States or possessions of the United States and foreign countries and in and between foreign countries.

To Speed Spare Parts

A bill proposing an amendment to the aircraft procurement bill of 1926 would enable the Army and Navy to speed up purchase of spare parts to replace broken or worn out parts of aircraft by eliminating requirement to advertise and receive bids.

Representative James, of Michigan, has offered a bill in the House to appropriate federal funds for aviation fields and other purposes, the whole amount being $347,536, as follows: Selfridge Field, Mich., improvement of landing field, $125,000; Shreveport, La., improvement of landing field, $50,000; Maxwell Field, Ala., school building, $100,000; Boston Airport, East Boston, Mass., moving and re-erecting technical buildings, $15,000; Fort Crockett, Tex., night flying lighting system, $3,775, runways, $10,775; Hawaiian Department, air bases, $22,000; Chicago Municipal Airport, Chicago, Ill., completion of hangar, $20,986.

The Michigan state supervisor of industrial education is preparing regulations to govern the operations of flying schools in that state. The state police will cooperate in the enforcement when adopted, it is said.

Minnesota law-makers face three bills. One seeks uniform aviation laws for the state, a second calls for a code conforming to that of the federal aeronautics branch, the third would remove from the larger cities existing restrictions relative to airport costs and the number allowed in any one city.

Park Land for Airports

Wisconsin and Colorado bills would adopt codes conforming to the federal regulations, also Wisconsin in addition seeks its own standards for pilots carrying passengers or property for hire, while in Colorado the bill would give communities the right to build and operate airports within the city limits, allowing land acquired for park purposes to be diverted to airport use.

A New York bill seeks to relieve cities within the state from liability for damages to planes cracked up in landing. This is to meet the interpretation of the law to the effect that cities marking their airports to guide pilots issue an invitation to land and consequently are held liable for any damage that might result. Several airports are unmarked on account of this interpretation.

The Illinois legislature is to consider a bill which would authorize a city to levy a tax of one mill on each dollar of taxable property within the city to pay for an airport, authorized to take over a site by right of eminent domain and exempt the airport financing from certain state restrictions.

Legislation to permit city bonds for municipal airports will be asked of the North Dakota legislature, now in session, by the North Dakota League of Municipalities.

Approvals Given By Government

Approved type certificates 13, 14 and 15 for engines have been granted the Wright Aeronautical Corp., and Pratt & Whitney Aircraft Co., the Department of Commerce announces.

Engines approved for license without approved type certificates include the De Haviland Gypsy, four cylinder vertical air cooled; Siemens-Halske, 5, 7 and 9 cylinder radial types and the Walter N Z., 9 cylinder radial.

Approved type aircraft certificate 96 has been assigned to the Fokker Aircraft Corp. F-10A 14 place closed land monoplane powered with three Wasps.

Approved propellers 3, 4 and 5 have been assigned to the Hamilton H-1207, H-1407 and H-1909 types.

Curtiss and Caproni To Build Transports

NEW YORK N Y.—Curtiss Caproni Inc., a new company organized by the Curtiss interests and the Societa Aeroplani Caproni of Milan, Italy, for the manufacture in this country of aircraft of the Caproni type under Curtiss supervision, has been announced here by C. M. Keys.

The plan will enable the Curtiss company to break into the larger transport aircraft field almost immediately, saving about two years which might have been required in an attempt to blaze its own way. Caproni has specialized on large planes for more than 20 yr.

The board of directors and plan of financing which is reported to involve issuing 400,000 shares of stock, a large proportion of which will be held by the two companies, are among further details to be announced within a few days. The location of the factory has not been determined, it is said.

Universal Receives Fokkers

CHICAGO, ILL.—Universal Aviation Corp. announces acceptance of delivery at the Chicago Municipal Airport on two of its new fleet of Fokker F-10 planes. Ten new Fokkers are to be placed in service both east and west out of Chicago immediately according to P. G. Kemp, in charge of traffic for the Universal lines.

Army Orders 15 Wasps

HARTFORD, CONN.—Orders for 15 450 hp Wasp engines and spare parts have been received by the Pratt & Whitney Aircraft Co. from the U. S. Army, a total value of approximately $100,000 being represented in the deal. The power plants it is reported, are to be used in Ford and Fokker tri-engined transports.

Trella Aircraft Completes Plane

Two Place Open Cockpit Biplane Tested at Detroit

DETROIT, MICH.—A two place, open cockpit biplane known as the "Speedster" has been completed by Trella Aircraft, recently organized here. The initial product, an experimental model, is powered by an Anzani 60 although, it was said, all standard models will utilize either the LeBlond 60 or the Velie M 5 engine.

Following conventional practice, the Speedster has a wooden wing structure, and a fuselage and empennage of steel tubing with wire bracing. The fuselage construction is of the truss type, well streamlined, with ample room in both cockpits. The cockpits are set in tandem. Wings on the first plane are of modified U S A 5 section, but this will be changed to a Clark Y section on the second product.

Dual Control Provided

Dual control, of the push and pull type, is provided. The landing chassis is of the split axle type, the wheels having a tread of six feet. Conventional rubber shock cords are used as shock absorbers.

Standard equipment includes tachometer, altimeter, oil gauge, oil thermometer, magneto switch, and choke. The plane is fitted with a 20 gal. gravity feed gasoline tank. All cowling can easily be removed. It is planned to place the first plane on exhibit in the second annual All-American Aircraft Show.

The Speedster was test flown by Rowland Thomas, test pilot for the firm. Associated in the company are George A Trella, F Jay Trella, and D M Trella.

Specifications furnished by the manufacturer are:

Span, upper wing	27 ft. 6 in
Span, lower wing	23 ft 6 in
Overall length	19 ft 2 in.
Height	7 ft 6 in
Chord both wings	4 ft
Stagger	7¾ in
Dihedral, lower wing only	1½ in
Incidence, both wings	2 deg
Wing area	192 sq. ft
Stabilizer area	14 sq. ft
Elevator area	10 sq. ft
Rudder area	5½ sq. ft
Fin area	2½ sq. ft
Aileron area	20 sq. ft
Weight, empty	600 lb
Weight, loaded	1,050 lb
High speed (estimated)	110 m.p.h
Cruising speed (estimated)	98 m.p.h
Landing speed (estimated)	36 m.p.h

Starter Rights Sold to Eclipse

ELMIRA, N Y.—That patent properties of the Aeromarine interests of Keyport, N. J., relating to engine starters have been sold to the Eclipse Machine Co. of this city is announced by William L. McGrath, vice-president of the latter concern. The Eclipse firm, maker of Eclipse Aircraft power plant starters, will hereafter service the engine starters heretofore manufactured by Aeromarine Starter Co., Inc.

New Series Keystone Panther Goes to Army

BRISTOL, PA.—The Air Corps has taken delivery on the first of a new series of 35 Keystone Panther bombers, powered by two Wright Cyclone engines. This first machine is to undergo official Air Corps tests at McCook Field, Dayton, O. Others are to be delivered at the rate of one or more a week, and are to be assigned to various posts throughout the country and Panama.

The Panther carries a bomb load of 2,200 lb., has five machine guns, radio receiving and sending sets, night flying equipment and latest navigating instruments. It weighs 13,000 lb. and is declared to have a high speed of 125 m.p.h.

A front quarter view of the "Speedster" built by Trella Aircraft

Kreutzer Starts Line Production

Takes Over Former Bach Factory To Meet Demands; Will Build Plant Soon

LOS ANGELES, CALIF.—In order to meet the demand for immediate production of the Kreutzer "Air Coach," the Kreutzer Corporation has taken over the factory at Santa Monica which was formerly occupied by the Bach Aircraft Corp., and has started line production, with an initial unit of five planes now under way. Bach activities have been moved to the new factory at the Los Angeles Metropolitan Airport.

According to the announcement made by Joseph Kreutzer, president of the Kreutzer Corporation, his company will soon let contracts for the construction of a modern tile and steel factory building on one of the municipal air fields in Southern California. The new factory will measure 200 by 300 ft., and with a balcony floor will have a total floor space of 68,500 sq. ft. Acquisition of the Bach plant, he stated, was an emergency move to meet the demand for immediate production. In addition to the five planes under way at the newly acquired Bach plant, the third "Air Coach" is nearing completion in the Los Angeles plant. It is said that minimum requirements of the Kreutzer dealer organization call for a production of 266 "Air Coach" models during 1929. Plans have been definitely laid to surpass this minimum figure and company officials plan to be building an "Air Coach" per day by April 15.

"Air Coach" First to Be Tested

The "Air Coach" is the first Kreutzer product to be tested. It is a four place, high wing, cabin monoplane powered by three Velie or LeBlond five cylinder aircraft engines. Remarkable performance has been shown by rigid flight tests and during a 2,000 mi. tour made by Lieut. Henry H. Ogden, Around-the-World flier and now chief pilot for the Kreutzer Corporation.

The second Kreutzer product, a 32 place, tri-engined transport monoplane, is now under construction. This plane will carry 28 passengers and 2,350 lb. of mail or express, in addition to the crew and fuel load. Crew will consist of two pilots, radio operator and navigator. A directional reception radio set will be installed on the plane in addition to a short wave transmitting set. Every travel convenience will be provided passengers, including a buffet lunch to be served in flight. Top speed for this plane is promised at 135 m.p.h., with a cruising speed of 115 m.p.h.

This plane is being developed to the requirements of one of the largest transport companies in America, it is said, and a large number of this type are to be ordered.

Stearman Tests New Mail Plane

Performance of Cyclone Powered Craft Exceeds Predictions

WICHITA, KAN—Preliminary test flights of the Wright Cyclone powered "Speed Mail" plane developed by the Stearman Aircraft Co., were conducted here recently. This model is somewhat similar in design and construction to the present Stearman mail plane but embodies a number of improvements and is specially intended for use with the Cyclone engine. The plane was designed at the instance of Walter T. Varney and plans are under way to use this type on the Salt Lake City-Pasco, Wash., route operated by Varney Air Lines after night flying is inaugurated over that route in the Spring.

Results of the preliminary tests indicate that the predicted performance of the new plane will be surpassed. The estimated high speed is 150 m.p.h., cruising speed, 120 m.p.h., and landing speed, 55 m.p.h. A rate of climb at sea level of 1,400 ft. per min. and a service ceiling of 19 000 ft. is also expected. The plane has a weight light of 3,360 lb., a pay load of 1,000 lb. and a gross weight of 5 460 lb. The upper wing span is 46 ft., lower wing span is 32 ft., the overall length 36 ft. and the height 12 ft. Ninety-one cubic feet of mail and express cargo space is provided.

Higher Speed Expected

In the tests an indicated speed of 150 m.p.h. was attained at 1 800 r.p.m., but it is expected that a slight change in propeller setting will permit a higher engine speed. The landing speed is said to be considerably below the predicted figure.

The "Speed Mail" plane, which might be called a sesquiplane, is of conventional construction with wood wing and welded chrome molybdenum steel tube fuselage structure. The trussing is so designed as to provide a mail compartment free of all obstructions and the mail pit is so located that it can be loaded or unloaded from the front or back. Fabric covering is used for the entire plane except for that portion of the fuselage immediately forward of the pilot's cockpit, which is paneled sheet aluminum and removable to permit ease of inspection. The plane is well streamlined, resulting in a good combination of pleasing appearance and aerodynamic efficiency.

Lighting System is Complete

Among the outstanding features of this plane are the indirectly lighted instrument panel and the convenient grouping of instruments. Instrument illumination is controlled by rheostats so that the intensity may be suited to the particular needs of the pilot. Five hundred feet of wire is used in the electric system and all wiring is shielded and in conduit. Inspection of wiring and fuel lines is easily made by removing the side cowling. A heater and adjustable seat and controls are provided in the pilot's cockpit. The Bendix brakes are operated by pressure on the top of the rudder pedal.

Included in the equipment is a Phister Ace Pressure fire extinguisher located in the cockpit and having nozzles located at convenient points around the engine. An ice warning indicator is also provided.

Report Record Of B. G. Plugs

NEW YORK, N. Y.—That the stock B G spark plugs used in the record-breaking plane "Question Mark" functioned perfectly throughout the long flight with no changes of plugs necessary and with no evidence of failure, is reported by the field representative of the B G Corporation, maker of the plugs. This statement is issued by August Goldsmith, president of the company, to correct an erroneous impression that the continued use of the plugs for more than 150 hr. without inspection or adjustment contributed to the final descent of the Fokker plane.

Scenic Airways Has 19 Aircraft Ordered

PHOENIX, ARIZ.—Nineteen additional planes, seven four-passenger cabins, seven six-passenger cabins, and five training craft are scheduled for 1929 delivery to Scenic Airways, to be used in the Southwestern states with Phoenix as base, according to an authorized interview given out by the officials of the company.

Three of these, two Consolidated Husky Junior training planes with Warner engines, and one Fairchild 21 powered with a Genet, are already being ferried from the factories to the Phoenix airport of Scenic Airways. The Arizona Company, it is said, will act as distributors of Fairchild planes throughout the Southwest.

Meantime work is proceeding rapidly on the company's new airport here. The building being erected for passenger terminal and administration purposes is near completion. Construction of a 100 by 120 ft all-steel hangar is scheduled to begin soon.

Will Build More Gliders

SAN LEANDRO, CALIF.—Further production of engineless craft is planned by Aircraft Industries, Inc., according to A. R. Wild, a firm official, following the successful test flight here of its German training-type monoplane glider, in which Vance Breese, former mail pilot, took the craft a distance of 590 ft. in a 51 sec. flight.

New Flying Boat Gets Try-Out at Anacostia

ANACOSTIA, D. C.—Tests and acceptance trials of the XYP-1, an experimental type of flying boat developed by the Consolidated Aircraft Corp. of Buffalo, N. Y., are now under way here. The craft follows the winning design of the flying boat competition held by the Navy early in 1928.

This seaplane is of a monoplane type with metal hull, has two 450 hp. Pratt & Whitney Wasp engines and emplacement for a third engine. Its wing span is 100 ft. and it has two Richardson type wing tip pontoons.

The contract for this plane was awarded on Feb. 28, 1928 and the plane was flown for the first time at the Naval Air Station Anacostia, on January 10, with Lieut. A. W. Gorton, U. S. N., pilot, and M. J. M. Ladden, chief engineer, Consolidated Aircraft Corp., observer. The plane was flown again on Friday, January 11, and is now being tried out by the Navy's Test Board at Anacostia.

This flying boat is directly convertible into a commercial type transport and has a compartment 60 ft. long designed to hold 32 passengers.

Lieut. Uzal G. Ent to Receive Cheney Medal

WASHINGTON, D. C.—Lieut. Uzal G. Ent, Air Corps, stationed at Langley Field, Va., has been designated to receive the Cheney Medal for 1928 for valor and self-sacrifice. The award of $500 and a bronze plaque bearing his name was the result of heroism displayed on May 30 when the balloon in which Lieut. Ent was serving as aide to Lieut. Paul Evert, Air Corps, in the National Elimination Balloon Race caught fire over Youngwood, Pa.

Instead of jumping from the disabled craft and leaving Lieut. Evert, who had been rendered unconscious by the electric shock, to his fate, Ent managed to maneuver the burning balloon to the ground and attempted unsuccessfully to resuscitate his companion.

Douglas to Add 200

SANTA MONICA, CALIF.—With 700 employees of the Douglas Airplane Co. payroll it will be necessary to increase this number to 900 at once in order to take care of unfilled orders, according to the recent announcement of Donald Douglas. It is said that the Douglas company enters 1929 with $2,900,000 in unfilled orders on the books, $613,000 of this amount representing orders taken since Dec. 1, 1928.

Prest-O-Lite Has New Plant

MEMPHIS, TENN.—A new Prest-O-Lite acetylene plant has been opened here at 1241 North McLean Boulevard, the thirty-sixth of this firm's chain. J. Brown is superintendent of the plant.

Mexico Waco Sales Agency Announced

LOS ANGELES, CALIF.—Appointment of the American Aircraft Corp., Los Angeles, as distributors of Waco aircraft for the entire Republic of Mexico has been made by Theodore F. Hull. The American Aircraft Corp. sold 106 Wacos and 5 Fairchilds during 1928 in the western territory, which includes California, Arizona, New Mexico, Nevada, Utah, Wyoming and the Territory of Hawaii. Addition of the entire Mexican Republic to this territory gives the American Aircraft Corp. one of the largest sales areas of any distributor of commercial aircraft in the world.

Mr. Hull has just returned from a flying tour of Mexico which included stops at Mexicali, Guadalajara, Mazatlan, Tampico and Mexico City. A very great demand for flying instruction was found everywhere and the American Aircraft Corp. plans to establish agencies and flying schools in all important centers with Mexico City as the center of distribution.

The first Mexican dealership awarded was to the Club Aero Mexicali, located at the town of Mexicali, on the Border. Nelson Brittingham, organizer of the club, has taken delivery on his first Waco 10 and will start instruction and promotion of sales in the territory surrounding the Border city of Mexicali.

Army Appoints 195 Cadets

WASHINGTON, D. C.—The War Department has designated 195 cadets to start training at the Army primary flying schools at March and Brooks fields, March 1. Ninety will go to Brooks Field and 105 to March Field. Sixteen are non-commissioned officers and privates of the Regular Army and 74 are from the National Guard.

New Gliding Society Organized at Detroit

DETROIT, MICH.—J. C. Penney, Jr., of New York, and W. J. Scripps of Detroit, glider enthusiasts, recently announced here the formation of Pioneer Gliding and Soaring Society, an organization whose purpose it will be to popularize the art of engineless flight.

The society now has a membership of 50, it was said, and plans to begin operation at once in Orion, Mich., home of Gliders Inc., glider manufacturing firm, of which Mr. Scripps is president. Later the society plans to operate at Cape Cod, Mass., with Capt. Paul F. Roehre, German gliding expert, as chief instructor.

Mr. Penney is president of the society and Mr. Scripps is treasurer. Other officers are Mark A. Kearney, vice-president, E. W. Sawyer, secretary, and F. M. Blunk, chief of operations.

An Error—Please Note

On page 162 of last week's issue of AVIATION *there appeared a list of vendors to the Wright Whirlwind engines used on the refueling flight of the "Question Mark." Unfortunately the list was erroneous in part, and therefore the corrected list is printed below.*

Parts	Vendors	Address
Valves	Thompson Products Co.	Cleveland, O.
Piston Rings	American Hammered Piston Ring Co.	Baltimore, Md.
Ignition Wire "Airtite"	The Acme Wire Co.	New Haven, Conn.
Outer Ball Bearings, S.R.B.	Standard Steel & Bearing Co.	Plainville, Conn.
Rear Ball Bearings	Standard Steel & Bearing Co.	Plainville, Conn.
Thrust Bearings S.K.F.	S. K. F. Industries, Inc.	2004 Broadway, N. Y. C.
Accessory Ball Bearings (Normal)	Norma Hoffman Bearings Corp.	Stamford, Conn.
Magnetos (Scintilla)	Scintilla Magneto Co., Inc.	Sidney, N. Y.
Carburetor NAT 4-B	Stromberg Motor Devices Co.	58 E. 25th St., Chicago
Valve Springs	Miller and Van Winkle	18 Bridge St., Bklyn, N. Y.
Spark Plugs BG	B. G. Corporation	136 W. 52nd St., N. Y. C.
Crankshaft	Union Switch & Signal Co.	Swissvale, Pa.
Articulated Rods	Bethlehem Steel Corp.	Bethlehem, Pa.
Master Rods	Bethlehem Steel Corp.	Bethlehem, Pa.
Master Rod Bearings	Bohn Aluminum & Brass Corp.	Detroit, Mich.
Cam Drive Gear Rough Forging	Bethlehem Steel Corp.	Bethlehem, Pa.
Cylinder Barrell Rough Forging	Bethlehem Steel Corp.	Bethlehem, Pa.
Cam and Gear Rough Forging	Tioga Steel & Iron Co.	Easton, Pa.
Cam Driving Gear Rough Forging	Bethlehem Steel Corp.	Bethlehem, Pa.
Cam Driving Pinion Rough Forging	Bethlehem Steel Corp.	Bethlehem, Pa.
Ex. Valve Rocker Rough Forging	Bethlehem Steel Corp.	Bethlehem, Pa.
Int. Valve Rocker Rough Forging	Bethlehem Steel Corp.	Bethlehem, Pa.
Valve Tappet Guide Rough Forging	Endicott Forging & Mfg. Co.	Endicott, N. Y.
Ex. Pipe Flange Rough Forging	Endicott Forging & Mfg. Co.	Endicott, N. Y.
Intake Pipe	American Tube & Bending Co.	New Haven, Conn.
Crankshaft Bearing Rear	Bohn Aluminum & Brass Co.	Detroit, Mich.
Aluminum Alloy	Aluminum Company of America	Pittsburgh, Pa.
Gaskets	The Vellumoid Co.	Worcester, Mass.
Counterweights	Tioga Steel & Iron Co.	Easton, Pa.
Alemite	Bassick Manufacturing Co.	2650 N. Crawford Ave., Chicago

Buffalo's Aero Show Approved

Aeronautical Chamber Sanctions Exposition for March; 17 Planes Entered

BUFFALO, N. Y.—The Buffalo Aviation Show, to be held March 23 to 30, has received the official sanction of the Aeronautical Chamber of Commerce. To date, 17 airplanes have been entered. These include Consolidated Husky Junior, Curtiss Falcon-Knight, Curtiss Robin, General Airplanes Aristocrat, General Airplanes Surveyor, Waco, Ryan, Fairchild, American Eaglerock, Stearman, Stinson-Detroiter, Travel Air, Command Aire, Ford-Stout, Taylor Chummy, Cunningham-Hall, and Keystone.

The Buffalo Show will be held in the 174th Regiment armory, which has approximately 64,000 sq. ft. of usable floor space and is free from pillars, posts and other such obstructions. It is situated near the heart of the city.

The general committee in charge of the Show is headed by Maj. John M. Satterfield, known as the "father of aviation in Buffalo." Members of the committee include 70 of the leading bankers and business men. The Buffalo Chamber of Commerce also is taking an active interest. George B. Bodenhoff is manager.

Twenty Chamber Acceptances

Letters were sent to 150 chambers of commerce inviting them to visit the Buffalo Show and to date acceptances have been received from 20. This means 20 other cities already have signified their intention of sending official representatives to the Show.

Planes flown to the Buffalo airport for the show will be hauled to the armory under direction of the transportation committee at the expense of the show. It has been arranged also with the Michigan Central Railroad to make overnight shipments of planes from Buffalo to Detroit for the show in the latter city, which opens a week after the local one closes.

March 22 has been designated as trade day and only holders of special tickets will be admitted. Detailed information may be obtained from Buffalo Aviation Show, 303 Mutual Building, Buffalo, N. Y.

Seek Alaskan Flier

WASHINGTON, D. C.—Efforts by the War Department to locate James D. Long, formerly sergeant in the Air Service, have thus far been futile, it is stated here. The Distinguished Flying Cross was awarded the airman last August in recognition of his participation as assistant chief mechanic on the Alaskan Flying Expedition, July 15-Oct. 20, 1920, but the Department has been unable to find him to present him with the decoration. Sergeant Long was discharged from service in August, 1922.

Operators Plan Radio Network

Will Develop Chain Independently of Government; Committee Chosen

WASHINGTON, D C—The first statement of policy respecting the use of radio by air transport operators came out of a conference here recently at which representatives took the initial step toward organizing for the establishment of a co-operative network of stations for communications with airplanes in flight.

Insistence upon priority for aircraft along with planes in the short wave radio band and an intention to set up and operate their own radio systems in the 64 channels assigned, rather than to work through commercial radio communication companies, marked the discussions Called by the Aeronautical Chamber of Commerce, the meetings at the Carlton Hotel attracted about 25 representatives and radio experts from the air transport companies the radio industry and the Government.

Commercial Use Banned

Thorpe Hiscock of Boeing Air Transport Co., chairman of the committee, declared that the aviation world regards its assignment of radio frequencies as not having a commercial feature Commercial radio will be kept out of the networks which the private operators propose to work mutually, and the industry intends to oppose any plan to make its radio system a public utility

The operators also propose to obtain more and different frequencies from those assigned by the Federal Radio Commission Lieut Comdr T A. M Craven, detailed by the Navy to the Radio Commission as engineer in charge of the short waves, was urged to seek a mutual basis of organization and operation with Canadian operators at the forthcoming short wave conferences at Ottawa

To Exchange Data

The trend of the discussion was that radiotelephony is the primary consideration of the commercial operators in their plans to utilize radio more extensively on their planes According to Capt F C Hingsburg, chief engineer of the Airways Division of the Department of Commerce, the radio communications service on the civil airways is intended for an exchange of weather data, the broadcast of weather information and forecasts, orders to pilots in flight, the dispatch of planes and radio direction for the guidance of planes

These services are being made available as fast as the network, which will have 30 stations in operation by June 30, can be extended, said Captain Hingsburg Private facilities are needed however, to supplement these services he added The privately operated system, he said, would make provision for safety communications similar to Government aids on routes other than civil airways radiotelephone of landing directions at airports, marker beacons and field localizers at airports and other radiotelephone communications to and from airplanes for the convenience, comfort and safety of passengers

A technical sub-committee, consisting of the following, is appointed to confer with the federal radio authorities to make recommendations as to the allocation of specific bands and the reallocation of various interfering bands in coastal regions Thorpe Hiscock, Boeing Air Transport Co, chairman, Herbert Hoover, Jr., Western Air Express Paul Goldsborough, Universal Aviation Corp H. C. Lentnritz Pan American Airways, and E W Proctor, National Air Transport W J Walls Department of Commerce, is invited to sit with the technical sub-committee.

More Business For Sign Plane

NEW YORK, N Y—Successful utilization of the Keystone Sign Carrier I in advertising automobiles during the New York Auto Show with its flashing neon words "Cadillac-La Salle"—"Hit of Auto Show," has brought the Cadillac Motor Car Co. to schedule the use of the Aerial Advertising Corp.'s plane for flights over Newark, Philadelphia, Brooklyn, Cleveland, Detroit, and Chicago during auto shows at those cities. Capt Eddie Rickenbacker, American war ace and Cadillac assistant sales manager, was largely responsible for the contract Roland Rohlfs, one-time altitude record holder, will again pilot the converted bomber.

Husky Firm Has New Plant

KENOSHA, WIS—The Husky Corporation, formerly known as the Husky Wrench Co has moved into its new plant here The factory, offering 40 000 ft. of floor space, is laid out on an 11 acre tract It is well equipped with modern machinery for making Husky socket wrenches and the various other products for which the firm is known

A.I.E.E. to Discuss Aviation

NEW YORK, N Y.—Aviation will be of primary importance as subject matter in the annual convention of the American Institute of Electrical Engineers scheduled to be held here January 28 to February 1 Directional radio devices and various other electrical aids to flying will be dealt with chiefly in the discussions.

Modern Engine Shop Planned by Thompson

CLEVELAND O—One of the most modern aircraft engine overhaul shops in the Middle West will be in operation at the Cleveland hangar of the Thompson Aeronautical Corp by February 15, it is announced by Edwin G Thompson, president The announcement followed the granting of a franchise for the exclusive sale of Wright engine parts in Cleveland and northern Ohio to the Thompson company by the Wright Aeronautical Corp. of Paterson, N J

The Thompson corporation thus becomes one of four concerns in the country authorized to repair and rebuild Wright engines under supervision of the Wright factory With the nearest similar repair hangars in Detroit and New York the new shop, at an intermediate point, can render a needed service, Thompson believes.

Herbert E. Smith, manager of the Ohio Division of the Thompson company will superintend the repair service Four mechanics, trained by experts from the Wright factory, will be used at the start. Every power plant overhauled will receive a 10 hr block test to check horsepower, gas and oil consumption etc, before being remounted and released.

Mill Basin Aircraft Buys Brooklyn Site

BROOKLYN, N Y—The first step in the development of airplane industry along the Jamaica Bay waterfront close to the new municipal airport at Barren Island, recently, took place when Mill Basin Aircraft Inc purchased a 100 ft waterfront on Mill Basin

According to Edward Wengenroth, president of the company work will be started at once on the erection of a modern plant where the new "Supergull" will be manufactured.

The new Whirlwind-powered flying boat has been given its official tests.

The announcement was made also that Brooklyn Air Transport a subsidiary of the Mill Basin Aircraft, Inc, will inaugurate Florida-New York passenger service in the spring The Barren Island field will be used as a base

Plan New "Skylark" Factory

COLUMBUS, O—Location of a modern factory on a site near the new municipal airport has been announced by the Columbus Aircraft Co, manufacturers of "The Skylark," a three-place cabin monoplane

The first plane to be made by the concern recently was brought back from the East where it was fitted with a Curtiss Challenger engine Ten of these power plants were purchased for other craft to be constructed The factory will in all probability employ 200 men at first, according to A J Frame, president of the company who aided in the design of The Skylark.

Scintilla Magneto Has New Plant Equipment

SIDNEY, N Y—Manufacturing and office facilities of the Scintilla Magneto Co, Inc., will total 80,000 sq ft with the addition of the new brick and steel factory unit, availing 40,000 sq ft., now nearing completion. Constantly increasing demand for its aircraft magnetos has necessitated expansion.

The most modern automatic machinery is being transferred from the old building to the new, augmented by specially designed machine tools that promise much toward the reduction of manufacturing costs

Production of Scintilla aircraft magnetos at the factory has reached 1,200 units per month, and the production schedule for 1929 has been set at 2 000 per month, with the new building and its machinery available In addition to these magnetos the delivery schedule calls for 1 000 units per month, of the three, four five, six and seven cylinder types which are imported and in all instances carefully inspected and tested

There are 450 employees on the payroll The factory is running night and day in an endeavor to maintain delivery schedules

Fowler Wing Tested On Pitcairn Fuselage

NEW BRUNSWICK N J—A series of test flights were made recently with a Pitcairn PA-3 biplane to determine the relative performance of the plane with ordinary equipment and with the variable area wing invented by Harlan D Fowler of New Brunswick The table of comparative performance is as follows.

	Fowler Variable Area Extended	Fowler Variable Area Normal	Original PA 3
Total load, lb.	1990	1990	1936
Wing area, sq ft	166	136	338
Climb from rest to 1 000 ft.	3'35"	3'33"	2'3"
Climb ft per min at 1 000 ft	250	415	520
High speed m.p h.	78.75	93 75	89 3
Cruising speed, m.p h.	66 25	70.85	76.6
Low speed, m.p h.	44 55	58.25	46 2
Stick, sec.	11	----	10
Unstick sec.	11		9
Speed range	1 77	2 22	1 93
Weight per hp at 100 hp	19 90	16 00	10.36
Weight per sq ft	12 00	14 65	5.72
Design load factor of wing	8.00	6 00	3 50
Weight of wings, complete lb	395	355	377

Swallow Plans Cabin Plane

WICHITA, KAN—The Swallow Airplane Manufacturing Co, here, is working on a new cabin biplane to be powered with the new Wright 225 hp engine Along with the new cabin plane, the Swallow company during 1929 will give major consideration to the new two place training craft and to the Whirlwind powered three place open cockpit plane It is planned to exhibit all three types at the Detroit show

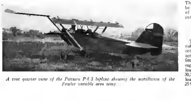
Warner to Expand Present Production

DETROIT, MICH.—An expansion program, approximately doubling the present output, was announced recently by W O Warner, president of the Warner Aircraft Corp, builders of the Warner Scarab seven cylinder radial air cooled engine

In commenting upon 1929 schedules and plans, Mr Warner stated "Our original production program for the 1929 fiscal year called for 500 engines However, the reception accorded our product during the past year by various aircraft manufacturing concerns has been so far in excess of our anticipations that we have unfilled orders far beyond our capacity for the coming year Although an expansion program is under way and new buildings are being contracted for to increase our capacity, this space will not be available for some time, our original schedule will be approximately doubled for the year

Rename Flying Circus New Standard Service

PATERSON, N J—Operation of the New Standard Flying Service Inc, formerly known as the Gates Flying Circus has been placed in charge of Maj William C Brooks, former chief of the Nicaraguan Air Service. Major Brooks opened the New Year by starting a tour of the Southern States with a fleet of four planes He will return shortly to enlarge the flying school and passenger service at Teterboro Airport Hasbrouck Heights, N J John Ashcraft, Ive McKinney, Homer Fackler and Warren B Smith are numbered among the Service's personnel



A rear quarter view of the Pitcairn PA 3 biplane showing the installation of the Fowler variable area wing

Aeronautics Branch Wins Collier Trophy

WASHINGTON, D C—The Collier Trophy, awarded annually to the person or organization which has made the most outstanding contribution to aviation over a period of one year goes to the Aeronautics Branch, Department of Commerce, for its record during 1928 The award was made by the special committee of the N A A under the deed of gift provided by the donor, Robert J. Collier, when the trophy was established in 1910

"America now leads the world in the use of aircraft for commercial purposes," says the statement of the committee which feels that the efficient, unselfish and untiring efforts of the entire personnel of the Aeronautics Branch has contributed more to this advancement than any other one thing" The committee included Dr G W Lewis, Capt E J King, U S N, Brig-Gen. B D Foulois, Rear Admiral H I Cone, Porter Adams, Carl F Schory, Col C. deF Chandler and Charles J Bell.

The trophy has been awarded nine times to individuals Glenn H. Curtiss and Elmer A Sperry receiving it twice, and three times heretofore to groups of individuals. The latter were the personnel of the air mail service in 1922 and 1923, for flying an entire year without a single fatal accident in 1922 and for demonstration of the practicability of night flying in 1923 and the Army Air Corps in 1924 for having completed the World Flight

To Hold Competition For Airport Designs

NEW YORK, N Y—A national airports design competition with prizes totaling $10 000 has been announced here following a meeting of a committee of architects sponsored by the Lehigh Portland Cement Co The contest, which closes about November 1, is expected to develop a set of designs of practical and inspirational importance to American cities

Harvey Wiley Corbett, architect, will head the committee drawing up the specifications of the competition and will act as foreman of the jury of awards The committee includes Francis Keally, who recently made an architectural study of European airports The Civics Committee of the contest will be headed by George B Ford, designer of airports and the Aeronautical Committee, by Porter Adams

Altitude Records Approved

The Federation Aeronautique Internationale has recognized as world records two altitude performances on September 14, 1928, by a Junkers W-34 fitted with a Bristol Jupiter series VIII supercharged engine With a useful load of 1,100 lb a record height of 30,143 ft was reached With a useful load of 2 200 lb a record height of 25 935 ft was reached.

Standard Tests Plan Completed

Scheme for Commercial Planes Reported to Be Ready For Application

NEW YORK, N. Y.—The plan for the standardization of performance tests on commercial airplanes devised by a joint committee of the Aeronautical Chamber of Commerce and other organizations, is reported ready for application. It is called the first step toward a common basis upon which all claims for speed ceiling, climb, etc. may be measured.

A pamphlet describing the Standardization Performance Testing Plan will be issued soon. The plan provides for tests by universities and technical schools cooperating with the Chamber. Only those characteristics of an airplane which can be obtained by exact measurement for the time being will be recorded.

A graduated scale of fees will be worked out to cover any or all of the following tests: 1 high speed, 2 climb to 10 000 ft., 3, ceiling; 4, angle of initial climb; 5, length of take-off; 6 time to unstick; 7, length of landing run; 8 landing speed, power off; 9 minimum speed, power on; 10, minimum speed, power off. Pilots for tests may be selected and paid by the manufacturers. The tests may be conducted at a field conveniently located for the manufacturer and the testing institution.

The plan has been under discussion for more than a year and is the result of careful study. It was approved at the Commercial Airplane Manufacturers Section of the Chamber at Chicago in December. Educational institutions interested in cooperating in the testing and others interested in the plan are requested to communicate with the Chamber at 300 Madison Ave., this city.

May Admit Planes in Parks

WASHINGTON, D C—Roy O West Department of the interior has sent out invitations to interested parties to attend the conference in his office on February 20 for the discussion of the possible admission of airplanes into the National Parks and the conditions under which they should be admitted. The invitations went to presidents of the interested railroads to park transportation concessionaires, airplane companies and to heads of various outdoor and mountaineering organizations.

Ofenstein Opens Offices

WASHINGTON, D C.—Announcement of the opening of offices in the Moran Building 1716 H Street, N.W., this city, is made by C L. Ofenstein, formerly chief of the engineering section, Aeronautics Branch, Department of Commerce

Call Standards Conference

PHILADELPHIA, PA—Through the manager of the Naval Aircraft Factory, Navy Yard, this city, the Fifth Annual Army-Navy Conference on Aircraft Standards is announced as scheduled for February 11 at the Factory. On behalf of the conference, the manager requests that those interested communicate with him at once in order that he may adequately prepare for the meeting.

Ireland Opens Branch Handling N-B Supplies

CURTISS FIELD, L I—The Nicholas-Beazley Airplane Co., Marshall, Mo., announces the establishment of its fourth aeronautical supply depot by the Ireland Aircraft Co., located at this airport. The depot will be separately maintained and operated by the Ireland firm, which has been named eastern representative of the Missouri company.

A complete and representative stock of all aeronautical supplies, parts and accessories will be found at the hangars and warehouses at Curtiss Field. The stock already has been placed on the shelves ready for sale. All parts for the popular aircraft engines aircraft parts and supplies, instruments and aeronautical accessories will be carried. It is planned to have a complete service operated in connection.

American Eagle Adds Dealers

KANSAS CITY, MO—Thirteen new contact dealers have been added to the sales staff of the American Eagle Aircraft Corp of this city in the last week, D H Hollowell, sales manager reports. They are T D Condon Forsville, Ind. George Auckney Pontiac, Mich. Richard G Jones, Chicago. H L Wood Chicago, O. J McCarthy Chicago. Sidney P Lowe, Chicago, G E. Christopher, Chicago; S B Benjamin Davenport, Ia. J E Cross Garnett, Kan. Pacific Aero Industries San Francisco C P Goldberg, St Asgar, Ia., W J Archer Rock Island Ill., and Marengo Airway Co of Marengo, Ia.

Bonforte Engineering Company Announced

NEW YORK, N Y—The Bonforte Airport Engineering Corp has been organized here as a firm of consulting engineers for airport and airway planning and development.

John Bonforte, president, recently resigned as acting chief engineer of Transcontinental Air Transport, Inc. He is a graduate of the Daniel Guggenheim School of Aeronautics, New York, N. Y. Mr. Bonforte has worked as field man and draftsman in the U S Air Mail Service and McCook Field as aeronautical engineer, flight-testing instruments. Upon the establishment of the Airways Division of the Department of Commerce he joined it as airway extension superintendent.

Mr. Bonforte has traveled extensively throughout the country selecting airports and landing fields laying out airways and supervising the construction of the lighting equipment for airways and landing fields. Ralph M Rice secretary and treasurer, is an architect of 20 years' experience in the design and supervision of all classes of architectural and engineering work. Associates of this organization include a civil engineer, a structural designer and a lighting and mechanical engineer.

Continental Exhibiting Seven Cylinder Engine

DETROIT, MICH—The first of a series of aircraft engines by the Continental Motor Corp of this city is being exhibited at automobile shows. It is the seven cylinder air-cooled radial type of a series which also includes engines of five and nine cylinders.

The brake horsepower is placed at 150 at 1850 r.p.m., with a fuel consumption of 13 gal. per hour and oil consumption of three gal per hour at full throttle. The weight is 400 lb. with carburetor and magnetos. Development of this engine follows considerable experiment by the Continental engineers over a lengthy period.

Railroad Man Aids Thompson Pilot Snowbound Aloft on Michigan Run

NILES, MICH.—A night railroad yardmaster here, armed with railway flares made an air rescue recently when he saved George A. Hill, mail pilot of the Thompson Aeronautical Corp, from a threatening crash in a snow storm.

Pilot Hill had taken off at Kalamazoo, Mich., for Chicago on the regular night air mail run. He left the Michigan city with the clear or favorable weather reports, but it was not long before a blizzard was encountered which was so thick that he was unable to pick up the Penn, Mich., beacon for nearly an hour. Arriving at Penn, he dared not land on the emergency field because of a number of large trees yet unremoved from the field.

Flying to Niles, 10 mi distant, where he knew of fields near a lighted railway yard, Hill hovered over the town waiting for a break in the storm enabling him to land. As he circled the community, G A Ream, the yardmaster, heard the drone of his engine and sensing his difficulty, seized two track flares, ran to a nearby field, and placed one at each end of the tract. Hill made a safe landing by the aid of these flares in spite of storm conditions which made his own useless.

Editor's Note—The Penn, Mich., Government beacon is the only one of four new lights on this route that has thus far been completed.

Personnel

LIEUT. RICHARD ALDWORTH, on leave from Langley Field, Va., has been appointed managing manager of the Newark Airport at an annual salary of $10 000.

J. A. F. WRIGHT has been elected president of the Wichita Blue Streak Motor Co to succeed CLYDE M. SMYSER, one of the organizers, who has resigned. STEWART M YOUNG is secretary-treasurer. A J COMBS, vice president, ROBERT C FOULSON, general counsel.

MAJ. HOWARD WEHRLE, war flier and air racing promotor, has resigned his position as sales manager of a hangar concern to join the Cessna Aircraft Co. as an executive.

HUGH T. GRATZ, Louisville, Ky., has appointed colonel on the staff of the governor of the state in recognition of his part in the early days of aviation. He was one of the organizers of the Gray Eagle Aviation Co., Mattoon, Ill., an exhibition concern, in 1911.

L. C WILSON, supervising inspector of of the Department of Commerce for Georgia, Florida, North Carolina South Carolina, Alabama, Tennessee, Mississippi and Louisiana, will move his headquarters from Miami, Fla., to Candler Field, Atlanta, around the 1st of February. CHARLES A. ROWE of New Orleans will be one of two assistants to Wilson.

DEAN BLAKE, Government meteorologist at San Diego, and ARCHIE ATHERTON demonstrator of the Russell Parachute Co., have joined the staff of the San Diego Air Service Corp. Blake will teach aeronautical meteorology and Atherton will teach parachute construction, repair and operation.

LIEUT CAMERON T ROBERTSON, who has been flying for Canadian Colonial Airways on the New York-Albany-Montreal route, has resigned to join the piloting staff of the National Air Transport. Robertson is a former member of the First Pursuit Group, Selfridge Field.

J E. DAVIDSON and AMOS THOMAS have been selected to serve six years on the Lincoln, Neb., municipal air commission. DR. J A TAMISIEA and A. H. FETTERS will serve four years and GOULD DIETZ and J. S McGURK will serve two years. Bond issue funds for the airport will not be available until March.

CAPT J B THOMPSON has been named manager of the downtown St. Paul office of Air Service, Inc., of Wichita, Kan.; C W YOUNG has been named manager of the Minneapolis office and JOE GOODALL has been named instructor in the mechanics course.

GORDON K HOOD manager of the Syracuse Municipal Airport, has been named general manager of the Central New York District for Curtiss Flying Service, Inc. Assumption of his new duties does not meant discontinuance of his work at the Syracuse Field, it is stated.

MASON PETERS, it has been announced by the Universal Aviation Corp board, has been appointed director of publicity with headquarters in Chicago. Mr Peters was formerly publisher of the *New York Journal of Commerce* and the Havana *Post*.

PROF. WILLIAM BROWN of Massachusetts Institute of Technology is to assist in the fog flying experiments being conducted at Mitchel Field, by Lieut. James H. Doolittle for the Guggenheim Fund.

JACK EULER, former mail pilot, has become chief instructor at the Dycer Airport flying school, Los Angeles. A total of 135 students are taking time.

D B COLYER has been named vice president in charge of operations for Boeing Air Transport, according to an announcement by P G Johnson, president of the firm. Mr Colyer, a veteran in air mail work, succeeds the late Edward Hubbard.

HUGH C. WHITE, former aviation editor of the Detroit *Free Press* has been appointed manager of the aeronautical division of the Truscon Steel Co., Youngstown, Pa.

CAPT EDDIE V RICKENBACKER war ace, has been named vice chairman of the National Defense Committee, Michigan Department of the American Legion. Mr Rickenbacker will direct aeronautical affairs.

Rankin Offering Installment Plan

PORTLAND, ORE—A plan similar to that used in selling automobiles has been inaugurated by the Rankin Flying Service, according to an announcement by Tex Rankin, head of the company. Arrangements have been made with two Portland finance companies to handle the deferred paper and insurance costs under the plan. Down payments will be from 30 to 50 per cent. of the total cost of the plane, Rankin said. The remainder of the purchase price will be paid in 10 or 12 monthly installments.

Black & Bigelow Expands

NEW YORK, N Y.—Creation of an airports division is announced by Black & Bigelow, Inc., air transport engineers of this city. Increasing volume of airports work, the firm reports, necessitates the move. Black & Bigelow was recently awarded the contract for the Central Airport to serve Philadelphia and Camden N J., and is also handling site selection and field design work for Aviation Country Clubs, the national flying club organization.

Trade Tips

It Has Been Reported That—

—The Southern Aeronautical Service, Inc., New Orleans, La., will let the contract about March 1 for one $80 000 hangar and several additional individual ones. Robert H. Polk, 601-9 Audubon Building, is an officer of the firm.

—Oscar Johnson is about to erect a 55 by 57 hangar, to cost about $17,000, at Anglum, Mo.

—A hangar, repair shop office, and sleeping quarters are to be constructed at the airport near Laredo, Tex. M. W. Breoham is chairman of the city airport committee, which is now arranging the plans.

—The Commercial Aircraft Corp. is planning the erection of a factory at the Metropolitan Airport, near Burbank, Calif., on a five acre site which has been secured. M. W. Griffith of Altadena, Calif., is president of the company, while Arthur B Green is general manager.

—Bids will be taken early in spring for the first unit of airport improvements to be made at the field near Bridgetown, Mo., by the Board of Public Service, City Hall St. Louis. Besides betterment of the ground and installation of floodlights an administration building and 120 by 180 ft. hangar will be constructed. Total improvements are expected to cost $2,000,000.

—Expenditure of $200,000 in improvements at Edwards Field, Main Street near Bray's Bridge, Houston, Tex., is planned by the newly-organized Houston Aerial Transportation Corp. W. L. Edwards, 1811 Binz Street, is an officer of the new firm which is reported to be capitalized at $1,000 000.

—W Wallace McKaig, of McKaig's Cumberland, Md., states that the firm wishes to purchase a airplane, the outstanding characteristics of which are "fool proofness, stability and low landing speed." A two place plane is desired.

To Study China Air Situation

NEW YORK, N Y.—E. P. Goodrich, architect of this city, will leave February 2 for China for a survey of the aviation situation in that country. He is interested in airways and airports development and airplane sales. The results of his study will be announced in July following his return here.

U. of V. Opens Aero Course

BURLINGTON, VT—A course in aerodynamics is now offered here at the University of Vermont under the department of mechanical engineering. Vollie R Yates, assistant professor of mechanical engineering is in charge.

AIRPORTS AND AIRLINES

Winnipeg-Omaha Service to Open

International Airways of Seattle Will Operate Over Route Tri-Weekly

SIOUX CITY, IA—Operation of an air mail, passenger and express line from Winnipeg Canada to Omaha, that will make regular stops at Sioux City, will be started before the end of February.

The line will be operated by the International Airways, Inc, of Seattle, Chris Larsen, Jr, secretary of the Chamber of Commerce announced. The information was contained in a letter received by R W Tarkaberry, general secretary of the Chamber from Ben Lawshe secretary of the Sioux Falls Chamber of Commerce who has been working with civic organizations here and in other cities along the line, in obtaining the service

It is probable that it will be started as a tri-weekly service, and increased to daily, if the business warrants. Stops will be made at Sioux City, Sioux Falls Watertown and Fargo A branch line will be started from either Watertown or Fargo to connect with the Twin Cities Schedule of the line has not been arranged as yet

At Winnipeg the line will connect with the Western Canada Airways Inc line at Omaha, with the regular transcontinental air mail planes Inauguration of this service is the direct result of the work accomplished by an organization formed several months ago at Omaha in which Sioux City business interests were included

Gets Option at Green Bay

GREEN BAY, WIS—The Brown County Park Commission has secured an option on the Blesch property, now operated as an airport under the name of the Brown County Airport Inc., which gives the county the privilege of using it on a rental basis for a period of time, with a right to purchase it later it was announced recently by Wenzel Wiesner, chairman of the commission

National System Leases Tract

CANTON, ILL—S F Tannus, president of National Airwys System, Inc, has signed a lease for 50 acres of land owned by W W Young lying two miles west of here. Mr Tannus plans to establish a school of instruction on the site

Record Mail Load Claimed

TOLEDO, O—Air mail load records in the United States were reported broken on January 19 when 28 planes carried away 700,000 air mail letters addressed by the Willys-Overland Co automobile manufacturer, to persons in 6000 cities and villages in all of the 48 states. Each letter was to reach its destination even in the most remote crossroad hamlet within 48 hr The airplanes covered 11000 mi of charted air routes of the United States, landing at 108 different airports

Pickwick Tests Bach For Passenger Line

LOS ANGELES, CALIF—Following recent test flights conducted by Capt. William Frye, flying a tri-engined Bach Transport, the Pickwick Airways, Inc., has announced the early inauguration of a passenger service over the San Francisco-Los Angeles San Diego route This line will be extended to El Paso, Tex., and on to Chicago it is said as soon as sufficient equipment can be obtained

On the recent flight Captain Frye flew the plane to San Francisco and back to Los Angeles with an average cruising speed of 125 m p h, nine passengers and two pilots being carried

The Bach Transport is a 10 place plane powered with a Pratt & Whitney Hornet in the nose and with a 150 hp Comet engine in each outboard nacelle. Passenger accommodations include a smoking compartment lavatory and hot and cold running water

Williston, N. D., Plans Hangar

WILLISTON, N D—Material is on the ground for the immediate construction of a double hangar on the municipal airport here The Murphy Construction Co has the contract and expects to finish the work shortly E M Canfield who operates a flying school and air taxi here, will lease the building and make it his permanent headquarters He will have a licensed pilot on the field to service visiting planes and will carry a stock of airplane parts

Permit for Fisk Hangar

SPRINGFIELD, MASS—A building permit to construct a hangar at Fisk Park Airport here has been granted the Springfield Airport Corp. The structure, to be 126 by 138 ft. and of steel construction, will cost about $10,000 it is estimated. Burton Edward Geckler is the architect.

Gulf Airlines Extends Service to Houston

NEW ORLEANS LA—Gulf Airlines, Inc, formerly known as the St Tammany Gulf Coast Airways Inc. has extended its Atlanta New Orleans mail and passenger service to Houston, Tex by way of Beaumont. Extension of this line further to connect with the Mexico City air mail planes at Brownsville is contemplated if the present route of the Mexican planes to Laredo over high mountains proves impracticable

Gulf Airlines planes, Fokker Super-Universals operate six days of the week They leave Houston at 8:45 A M, Beaumont at 9:40 A M, New Orleans at 1 P M Mobile at 2:35 P M., Birmingham at 7:10 P M. and arrive at Atlanta at 6:30 P M The return trip leaves Atlanta at 5:30 A M., Birmingham at 7:10 A. M., Mobile at 9:30 A M, New Orleans at 11:30 A M Beaumont at 2:25 P M and arrives at Houston at 3:15 P M

The officers are President, George Williams vice-president Leslie L. Watson secretary treasurer Esmond Phelps, general manager, W. N. DeWald traffic manager, V F Grima. The company uses the following fields New Orleans Alvin Callender Field Mobile, municipal airport Birmingham Roberts Field, Atlanta, Candler Field, Beaumont, municipal airport, Houston, Houston Airport

Ford Airport Assigned As Aerological Station

DETROIT MICH—A weather Bureau aerological station, one of 42 such stations established by the United States Department of Agriculture, has been placed at Ford Airport. Observations of the upper air will be taken daily at 7 A. M. and at 1 P. M.

The station has been erected atop one of the airport hangers, and is in charge of D S Post, a graduate of the U S Naval Aerological School at Anacostia D C Mr Post is assisted by H. B Duckworth, a transport pilot, employed by the Ford Motor Co

The new Government station offers a decided advantage to the Stout Air Services, Inc, operators of the Detroit-Chicago and Detroit-Cleveland air passenger line

Buckeye Airways Plans Field

COLUMBUS, O.—An additional airport has been promised for Columbus by Buckeye Airways, Inc., operator of a student training school. Buckeye Airways has secured a long term lease for Clirkenger Field, a 118 acre tract southeast of the city, where the firm will erect a hangar and install equipment

Big Universal Hangar Started at Cleveland

CLEVELAND, O—Construction has started on the new hangar of the Universal Air Lines system at Brookpark Airport here, which will be one of the largest in the country The building is to be 140 ft. by 110 ft. and the walls will be gray face brick inside and out, trimmed with stone The roof will be an innovation for the Cleveland field, being made of aluminum, which will give it a high visibility from the air

Special attention has been paid to the comfort of passengers and visitors at the field On the first floor a room 40 by 30 ft. will be equipped with easy chairs, a huge fireplace and plate glass windows overlooking the field At each end of the building on the second floor there will be observation porches

A R Bone, division traffic manager, announced that the contract for the construction of the hangar had been let to the Matheny Construction Co The architects are Calsch & Hefler. The Spohn Heating and Ventilating Co., Ward & Talbot, plumbers, and the Parker Electric Co. are sub-contractors

Butte, Mont., Chosen For Operating Base

MISSOULA MONT—The National Parks Airway Inc. operator of mail and passenger planes between Great Falls and Salt Lake City has announced that Butte will be made the central base of operations. Capt Herbert Marsh, operating superintendent for the company at Great Falls, states the construction of a large hangar and terminal shops in Butte and moving of the terminal point there from Salt Lake will be accomplished soon

The reason for change in terminals, according to Captain Marsh, is that it will give service to all parts of Montana and will facilitate the establishment of branches The ultimate object of the company is to make Montana the center of its operation headquarters It is believed that this will put Missoula in line for air passenger service in the near future

Forty Attend Two-Day Flying School in Texas

FORT WORTH, TEX—The two-day flying school conducted by the T A T Flying School in Fort Worth January 14-15 attracted an attendance of approximately 40 The school was for Chamber of Commerce secretaries and newspaper reporters of Texas

Object of the school was to familiarize the men with aeronautical nomenclature. Lectures were given by Jerry Marshall, manager of the flying school, Tom Hardin, general manager of Texas Air Transport, Inc., and D S Landis, federal weather observer in Fort Worth

Short hops were made the opening day with each of the students

To Spend Year On Flying Tour

LOS ANGELES, CALIF—One of the longest air tours ever conducted within the United States by a private individual is scheduled to start from Los Angeles when Harry H Culver, president elect of the National Association of Real Estate Boards, takes off in his own cabin plane on a tour of 650 American cities, the trip to require the entire year of 1929 The plane will be piloted by Lieut E R. Dickson.

Airvia to Provide Air Passengers Service

WICHITA, KAN—Airvia Inc, just granted a charter to do business as a concern offering air passenger service over the principal airlines of this country, is opening national headquarters in Wichita B E Moses secretary treasurer and general manager, says he has completed arrangements with 23 of the leading operators of air passenger lines whereby his organization can sell through passenger tickets to practically every city in America

J M Dunn of Kansas City is president of the concern, George H Bruce Wichita oil man is vice-president and C V Snyder, Henry Rosenthal and George L. Bennett of Kansas City, are directors At the outset the company will be represented at the airports and leading hotels of New York City, Los Angeles, Philadelphia, Washington, St Louis, Kansas City Milwaukee, an Cincinnati

Greenwood Aero Club Promotes New Airport

GREENWOOD, MISS—A new field is being provided here through the efforts of the local aviation club a chapter of the N A A The county supervisors bought the tract for $40,000 and extensive improvements, including marking tile drains and hangars are to be installed

The Aero Club has 40 members 35 of whom have been taking instruction at the old field and 19 have received Private Pilot licenses It has been using a field 1,000 ft long and 250 ft wide as compared with the new field, which includes 164 acres with two runways each 3100 ft long and 500 ft wide

Continental Service Opened

LOUISVILLE, KY.—Air express service between Cleveland and this city has just been inaugurated for daily service each way by Continental Air Lines, Inc., which holds this contract with the American Express Co. Stops between the two cities include Akron, Columbus, Dayton, and Cincinnati.

Ten Holmes Airport Directors Announced

NEW YORK, N Y—Ten of the board of 15 directors being organized to head the Holmes Airport project in Queens County have been announced by E H. Holmes, originator of the project Five other names will be announced soon, it is said

The board at present includes, besides Mr Holmes, Robert Adamson, vice-president of the Bank of the United States Stuard Hirshman, real estate owner Alexander Klemin Guggenheim School of Aeronautics of New York University, Robert W Higbie president of the Long Island Finance Corp; Edward F Clarke, president of the Rugby National Bank, W B. Harrison president of the Union National Bank of Wichita Kan., and director in the Cessna and Swallow companies; former Senator Clarence Wolfe of Philadelphia, vice president and director of the Hercules Cement Co., W. J Zurker of Chicago vice-president and director of the Stewart Speedometer Corp, and Ray Palmer director North American Water Works Corp

Seek Mail Connections

The Holmes tract includes 220 acres between Northern Boulevard and Astoria Ave west of Jackson Heights in Queens The promoters have been negotiating with the Post Office Department relative to air mail connections with no decision announced as yet An addition of about 80 acres more is expected soon.

Unique Beacon

This novel beacon, in use at the Cleveland Airport, was designed by the National Lamp Works of the General Electric Co. Fliers are guided by its rotating fan of light, while a red beam opposite each white one identifies the Cleveland Municipal Airport

Planning Texas Passenger Line

Texas Air Transport, Carrying Mail Now, to Expand as Equipment Arrives

FORT WORTH, TEX.—Plans for inaugurating air passenger service over eight different routes in Texas have been announced by Tom Hardin, general manager of Texas Air Transport, Inc., operator of two South Texas air mail routes. Service on the new lines will be instituted as soon and as fast as equipment can be received, Mr. Hardin stated. Travel Air cabin planes powered with Wright J-6 engines are to be used.

E. G. "Swede" Rhenstrom has been named manager of operations for the passenger lines. Rhenstorm was formerly with the Fairchild company.

Service Along Mail Points

Two of the lines will follow the regular air mail routes, although different passenger and mail schedules will be worked out. One of these routes is from Fort Worth and Dallas to Waco, Austin, San Antonio and Laredo. The other is from Fort Worth and Dallas to Waco, Houston and Galveston.

The other six lines will be between Fort Worth, Dallas and El Paso, Fort Worth, Dallas, Wichita Falls and Amarillo; Fort Worth and Dallas to Texarkana; Amarilla to San Antonio, San Antonio to Houston, and San Antonio to Brownsville, Tex. Intermediate stops, to be designated on several routes, have not been worked out. First of the lines probably will start operations within from 30 to 60 days depending on delivery of equipment. Headquarters of the firm is located in Fort Worth. Plans are being formed for establishing parts depots, air taxi service, and eventually training schools at the largest termini on the passenger lines.

Orders 15 Travel Airs

The largest single fly-away order for airplanes ever received in Wichita went on the books of Travel Air Manufacturing Company January 18 when Mr. Hardin bought 15 cabin monoplanes of a value of $13,500 each and ordered immediate delivery of 10 biplanes. The transports will be used on the mail line that books National Air Transport with the Mexican national air mail system, between Fort Worth and Laredo.

Texas Air Transport, operating at Fort Worth, was merged the first of the year with Travel Airways of Dallas, the latter Texas sales agent for the Wichita company. The 10 biplanes go to the Dallas sales rooms, the monoplanes directly into service, carrying mail.

Mr. Hardin, vice president of the Texas company, left Wichita January 19 in the first monoplane of the 15 ordered.

Plane Stewards Universal Plan

MINNEAPOLIS, MINN.—Establishment of steward service on planes operating over the Twin Cities-Chicago division of Universal Air Lines, was announced recently by Paul Goldsborough, vice-president of Universal Aviation Corp., in charge of the division. E. A. Monteron, Filipino member of the Army air service during the war, will act as steward.

Wichita Has $104,000 To Start Field Work

WICHITA, KAN.—A total of $104,000 already has been made available by the city commission of Wichita for initial work on the new 640-acre airport here. More than $250,000 is to be spent on improvements.

A $65,000 hangar is to be erected first, to be followed by a two-story administration building to cost $70,000. The hangar, of cantilever roof construction, will accommodate four tri-engined planes of 90 ft. wing spread and 15 smaller planes. It will be 270 by 102 ft. The administration building will house all offices and laboratories.

More than $20,000 will be spent in lighting the field. This work will be completed by May when Transcontinental Air Transport, National Air Transport and Western Air Express, will require use of the field. Lanscaping will cost $70,000.

There will be five runways, the shortest to be 3,600 ft. and the longest 4,800 ft. Landings and take offs will be possible in all directions. All of the Wichita factories, it is said, will have space on the airport, with many private hangars and sales buildings.

U.S.-Mexico Mail Rate Cut

WASHINGTON, D. C.—The domestic air mail rate of five cents for the first ounce and 10 cents for each ounce thereafter has been made applicable for air mail exchanged between this country and Mexico, the Post Office Department recently announced. The rate has been 20 cents an ounce. The Mexican domestic rate is to apply, also, for air mail posted in that country and addressed to points in the United States.

Yuma to Vote on Air Bonds

YUMA, ARIZ.—The Yuma County Board of Supervisors has called a bond election for February 26 to vote on a $25,000 issue for the improvement of Fly Field here. Hangars, oiled runways, and a deep well are part of the contemplated additions to the equipment. The Government has undertaken to install radio and meteorological apparatus.

Medford, Ore., Plans To Complete Airport

MEDFORD, Ore.—With the state supreme court upholding the validity of municipal bonds for airports, Medford is going ahead with its plans for a $110,000 airport three miles from the business district, which must be completed by June 1 when coastwise night air mail flying is inaugurated. Standards set by the Government for illuminated fields will be met.

The field will be a mile long and a half mile wide with main runways hard-surfaced and planes able to land in any direction. One hangar will be erected by the city and another by private parties with other equipment to be installed by Pacific Air Transport.

An administration building will house Department of Commerce officials and the weather bureau. Radio towers 128 ft. high will be installed by the Department one-half mile from the field. Plans include a building for a restaurant, comfort stations, fire station, and possibly a supply store. The airport is in charge of a committee from the local Chamber of Commerce, which has studied airports at Portland, Oakland, San Francisco and Los Angeles.

To Dedicate Glendale Airport February 17

GLENDALE, CALIF.—Formal dedication of the Grand Central Air Terminal, now under development at Glendale by C. C. Spicer, has been set for February 17, according to a recent announcement.

Two concrete runways will be placed in service at that time and the public will be permitted to inspect the Maddux hangars, which measure 130 by 400 ft., and the administration building for the new airport and for Maddux airlines, a building approximately 100 by 200 ft. in size.

A program of exhibition flying will include Army and Navy squadrons, flights by the California National Guard squadron, and a formation flight of 15 three-engined Ford cabin planes, among which will be at least three of the latest Wasp engined, 16 passenger Fords.

Needles, Calif., Gets Field

NEEDLES, CALIF.—A privately owned airport for Needles has been established by four local airminded business men. The landing field has a total of 320 acres, but only 60 have been cleared and levelled. It is located one mile south of Needles on the National Old Trails road. Prevailing wind is northeast-southwest. "Needles," in 20 ft. black letters, is marked on the white roof of the Standard Oil warehouse, east of town. A wind sock is the only permanent equipment at the field as yet. As soon as the plane "sits down," however, a gas and oil service car speeds to the field. If a pilot circles over Needles at night, flares will be placed.

FOREIGN ACTIVITIES

New German Dirigible Plans Given Approval

BERLIN, GERMANY.—The plans for the new German dirigible which have been under consideration some time, have been approved by the Zeppelin concern. A larger hangar to accommodate the new construction is to be built for occupancy in the Fall on the site of the two present hangars, which will be razed at once.

Some of the reported characteristics of this proposed ocean passenger Zeppelin are: Length 237 m. (same as Graf Zeppelin), diameter increased to 38 m., giving 150,000 cu. m. capacity, five 1,000-hp. engines, each fitted with tractor and pusher propellers, only four engine gondolas if possible; cells for lifting and fuel gas arranged as in previous ships; covering of linen, and reserve steering cabin.

Particular attention is to be given to the passenger quarters which will be completely rearranged according to experience gleaned from the Graf Zeppelin and an inspection of the English R-100. All passenger quarters are to be arranged in such a way as to give as clear a view in all directions as possible, the idea of a promenade deck similar to the English scheme having been abandoned.

An appropriation of $480,000 for beginning the construction of the new dirigible has been approved by the Federal Council. The Reichstag is said to be cooperating with the Zeppelin concern in the financing of the project.

Rule on Smoking in Planes

LONDON, ENGLAND.—Smoking in passenger planes in Great Britain and Northern Ireland may or may not be indulged in, according to the wishes of the operator of the air line. It is automatically prohibited in some type planes by the specifications contained in the airworthiness certificate. In any case, smoking is allowed only if the operator displays a sign announcing permission.

Turkey Orders French Planes

PARIS, FRANCE.—The Turkish Government has just concluded a contract with the Morane-Saulnier Plane Co. for 25 military planes to cost about $240,000. An order for 30 commercial and training planes, expected to be placed with French interests also, is reported to be pending.

Canada Has Helium

MONTREAL, CANADA.—Resources of helium gas sufficient to fill the world's dirigibles for years to come may be had in Canada, according to a bulletin issued here by the Department of Colonization and Development of the Canadian Pacific Railway. It is estimated that about 15,000,000 cu. ft. of helium is available in the natural gas deposits at Bow Island, Alberta, which can be produced at a cost of about 25 cents per cubic foot. Gas wells at Inglewood, Ontario, furthermore, are capable of producing 100,000 cu. ft. annual for an indefinite period. The Dominion Government owns the deposits.

Trans-Ocean Airlines Planned by Germans

BERLIN, GERMANY.—Luft Hansa reports plans to open regular trans Atlantic service in May to Buenos Aires and before the end of this year to a point on the North American continent, using at first three Rohrbach Romar flying boats to be supplemented later by Dornier and Junkers machines.

Three huge boats are being given rigid tests under severe conditions in the Baltic Sea and one later will be taken to Ireland for further trials. Early in the spring the planes are to be flown to Rio de Janeiro and Buenos Aires by way of the Azores and Cape Verde Island and thence to Bermuda, New York, Azores, Hamburg and back to this city.

Dominion Craft Totalled

OTTAWA, CANADA.—On Jan. 1, 1929, there were 333 airplanes in operation in Canada, more than three times the total of 101 on the same date a year ago. Of these, 246 are commercial planes and 87 government craft. Airports in Canada have increased from 25 to 44 in the past year, the number of licensed commercial pilots has increased from 40 to 190.

Vote Hamburg Improvements

HAMBURG, GERMANY.—The Hamburg airport is to be improved and a fund of more than $75,000 has been made available for the work. The changes include drainage, regrading, resurfacing and extension of the concrete surfaces.

To Open Bolivian Line

LA PAZ, BOLIVIA.—Air mail service between Cobija and Riberalta, in the northeast section of the country, is to be opened soon.

Hawaiian Airline To Link Islands

Capt. Lowell Smith Announces He Will Manage Commercial System

HONOLULU, HAWAII.—An airline to link Oahu, Maui and Hawaii islands of the Hawaiian group is being planned. Capt. Lowell Smith, only member of the World Flight still in the Air Corps and now stationed at Wheeler Field, is planning to secure a year's leave of absence to serve as manager of the proposed line. It is intimated he may resign from the Army at the end of his leave if the project is successful.

Col. Perry Myers Smoot, chairman of the Territorial Aeronautical Commission, is now on the West Coast making a study of all recommend airports between San Diego and Seattle relative to building a commercial system in Hawaii. Most of the fields in the chain will be built on coral reefs or volcanic rock, as all fertile land is needed for cultivation. Colonel Smoot is making the tour in a Fokker Super Universal piloted by Lieut. Paul Richter, Jr., of the Aero Corporation of Calif.

It was stated that five modern airports and six emergency fields are now under construction, $300,000 having been spent on this work during 1928. An appropriation of $500,000 for 1929 is to be asked of the next legislature. Because of the slow transportation afforded by small interisland steamers, Hawaii is said to be an exceedingly fertile field for the immediate development of commercial aviation in all phases.

Schneider Pilots Named

PARIS, FRANCE.—Two civilian pilots, Sadi Lecointe and Fernand Lasne, and two military pilots, Lieut. Louis Demougeot and Adjt. Florentine Bonnet, have been selected to fly French entries in the Schneider Cup Race. They are now in training and construction has been started on the four racing seaplanes to be used.

Fast Rescue Boat Planned

LONDON, ENGLAND.—A fast lifeboat, capable of a speed of about 20 m.p.h., is to be kept in readiness to rush to the aid of passenger planes forced down in the English Channel. Its special equipment includes a wireless telephone. The craft is to be stationed at Dover on the airway to the continent.

BUYER'S LOG BOOK

Millers Falls Valve Kits

THE MOTOR Service Kit No 50, manufactured by the Millers Falls Co, Millers Falls, Mass., is made especially for valve grinding and carbon removing and includes the patented universal centering attachment and the No 414 Electric Drill The box is made of heavy pressed steel, and tools arranged to make it well balanced for carrying. The total weight is 32 lb

The No 50 Motor Service Kit

This set contains two carbon cleaning brushes, 5/16 in and ⅜ in valve guide cleaning brushes; 4 in wire wheel brush, hand brush, centering attachment complete with centering bar, 5/16 in, 11/32 in and ¾ in pilots, "T" wrench, ball point, grinding wheel adapter, 1⅝ in 1¾ in and 2 in grinding wheels, wheel truing mandrel 45 deg master reamer, 15 deg and 75 deg narrowing reamers, grinding wheel, 4x½x½ arbor bench stand, and No 414-¼ in electric drill

The Motor Service Kit No 25 is similar to No 50 but without the No 414 electric drill and the No 1014 bench stand The weight of this set is 20 lb

Improved Welding Gloves

GAUNTLET GLOVES of a soft and pliable suede leather, specially treated to prevent heat from affecting it, to supersede the horsehide gloves formerly supplied are announced by the Oxweld Acetylene Co, 30 East 42nd St, New York City

A leather strip on the thumb seam and a semi-circular reinforcement on the inside seam adjoining the palm reinforce the glove The left glove has a leather reinforcement, covering the entire back between the fingers and gauntlet, for protecting the back of the left hand during cutting operations A close fitting gauntlet adequately protects the arms The reinforcements make them very durable

"Jack Frost" Goggles

TWO NEW types of goggles are now being manufactured by the Beck Distributing Corp, 68-70-72 East 131st St, New York City

The Jack Frost "Navigator" is the same as the Lamoglas "Navigator" goggle excepting that there is a lining of chamois under the rubber mask for warmth This lining extends to the tip of the nose

The Jack Frost "Seesall" is the same as the Seesall goggle excepting that here, too, a warm chamois lining is placed beneath the rubber mask A special model with tinted lenses is particularly suitable for flying over snow-covered country

SIDE SLIPS

By Robert R. Osborn.

Someone sent us a clipping from the Philadelphia *Public Ledger* which shows that the old Philadelphia conservatism is still operating The news article states that Dr Hugo Eckener spoke very favorably of that city as a possible airport for future Zeppelin Atlantic service, and with this in mind the city fathers were not going to consider any field for the municipal airport which wasn't at least 4,000 *sq ft in area* As the Graf Zeppelin, which Dr Eckener found to be too small and suitable for training purposes only, covers an area of 65,000 sq. ft. approximately, we think that 4,000 sq ft should be the absolute minimum

* * *

Mr R A R of Amsterdam, New York, sends in a picture from a local newspaper showing the operation of "*Defueling* the Question Mark and Its Crew" with the request that we explain just how that is done Mr R A R probably remembers the old story about the man who put so many gas savers on his car that he had to stop every once in a while to siphon out the excess gasoline which accumulated That's one possible solution of the "defueling" of the Question Mark but we haven't the slightest clue as to why defueling should be necessary for the crew.

* * *

The contributors seem to be running the column for us this week, which is a condition highly to be desired by any columnist, and probably desired by most of the readers. Mr. H J. J. of Gloucester, Mass, mails in an interesting clipping from the New York *World*. Under the headlines "Stillman Plane Near Crash on L I. When Take-Off Fails, Hempstead Watchers Get Shower of Gasoline as Pilot of Panama-Bound Plane Dumps Fuel," we find the statement "The North Star shot up to an altitude of about 200 ft and headed over Hempstead for Atlantic City Then the tachometer, which measures velocity changes, got bearish and dropped from 1,800 to 900 degrees"

The rest of the article states that no one could understand just what was the matter with the engine, but we think the headline explains it all very well In our experience, whenever a plane gets "Panama-Bound," probably caused by the cold weather, the tachometer always falls off 500 to 1,000 degrees

* * *

Mr. H H J of Kansas City, Mo, calls our attention to the following item "The growth of the airplane industry and flying has opened up two new avenues of fraud for racketeers, according to complaints filed here this week with C. E Fleming, division traffic manager of the Transcontinental Air Transport, Inc., and Robert M. Burtt, aviation director of the Chamber of Commerce. One scheme is for imposters to use a flier's helmet and goggles to convince hotels he is a mail pilot and then leaving without paying his bill The other is the selling of flying courses in small towns."

The Intrepid Aviator says that this news shows just how commonplace this flying business is getting to be, as he recalled, with tears in his eyes, the dear dead days when any aviator would be highly insulted if anyone asked him to pay for anything Incidentally he asked us to withdraw the previously published offer of his to trade the cheap helmets and goggles he got for Christmas He says that if he can get a week's board at a good hotel with each pair, he will have use for them

The "Question Mark"

During the record breaking flight of the "Question Mark", more than 22 tons of gas, oil, food and supplies were transferred from a supply ship flying above.

P & A Photos

Five men who have made aviation history. Left to right—Joe Nickrent of the National Air Association, official starter of the "Question Mark", shaking hands with Major Carl Spatz, Captain Ira Eaker, Lieutenant H. A. Halverson, Lieutenant Elwood Quesada, Sergeant Roy W. Hooe.

with PENNZOIL *in the* Motors shatters all sustained-flight Records

Over 6 days in the air—more than 150 hours —11,500 miles —42,522,000 engine revolutions—and safe lubrication.

Just before taking off. The tank truck has delivered its precious load of Pennzoil to assure safe lubrication for the three Wright Whirlwind Engines.

FIVE modest Army airmen, with hearts of steel, have done the most stupendous thing in aviation history.

Their spectacular feat is without a parallel. It turns to facts the things which yesterday were only dreams.

The history making flight of the "Question Mark" has definitely proved three things for aviation.

—that re-fueling and re-oiling in the air are entirely practical
—that minor motor adjustments can be made while a plane is in full flight
—that proper lubrication, with the best motor oil, increases tremendously the flying hours of the motor.

It was natural that Pennzoil was chosen to lubricate the motors of the "Question Mark"—the same oil that had kept the Bellanca plane "Columbia" in the air for a previous endurance record—the same oil that had taken Chamberlin to Germany—the same oil that carried Goebel-Tucker, Collyer-Tucker and Kelly-Macready on the only three successful non-stop flights across the country—the same oil that took Wilkins safely over the North Pole.

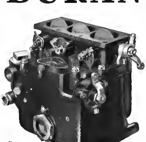
And this same Pennzoil is reducing costs, increasing flying hours and building profits for hundreds of planes in daily commercial service all over the country.

Pennzoil is 100% Pennsylvania Oil refined to perfection in the finished product. There is no better oil.

THE PENNZOIL COMPANY - *Oil City, Pennsylvania; Los Angeles, California*

SUPREME PENNSYLVANIA QUALITY
PENNZOIL
SAFE LUBRICATION
REG. U.S. PAT. OFF.

ENDURANCE



The famous NA-T4 aircraft carburetor used by the "Question Mark."

Stromberg carburetors are used as standard equipment by.

U S Army
U. S. Navy
U S Marine Corps
Aircraft Engine Co.
Allison Engineering Co
Axleson Machine Co
Curtiss Aeroplane & Motor Co.
Fairchild Caminez Engine Co.
Kinner Aeroplane & Motor Co
Packard Motor Car Co
Pratt & Whitney Aircraft Co
Warner Aircraft Co.
Wright Aeronautical Corp.

When the now famous "Question Mark" broke all records for continuous flying—Stromberg did its share to make that achievement possible.

"The Stromberg carburetors functioned perfectly—hardly any wear apparent," the crew reported.

Needless to say, we are proud of the part Stromberg played in this latest of endurance tests. For the aviation world this new record opens tremendous possibilities. To us, it corroborates the proof established by Lindbergh, Chamberlin, Byrd, and countless others—that our policy of building into our product the greatest possible degree of perfection, is the right one.

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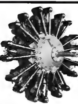

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FOR SALE Two OX-5 Eaglerocks one Waco 10, never crashed 75 hours each $2,250.00 each. Skycraft, Inc., 143 E. 29th St., New York N Y

STANDARD J-1 180 Hisso licensed new covering, spare center section and tools excellent condition $1500.00 Curtiss JN with rebuilt OX-5 $700.00 ships ready to fly Paul Russo, 2302 Denton Ave, Brooklyn N Y

MACHINE SHOP service on OX-5s. Cylinders reground, new pistons, pins and rings Graphite guides and inserted seats installed Oversize pins installed in valve actions More and connecting rod bearings line reamed All work guaranteed New OX 5 parts Write for complete circular Hoehmen Machine Works 4036 West Lake St Chicago, Ill

LARGE STOCK of brand new magnetos for sale. Original Robert Bosch eight cylinder magnetos, each $39.00; same six cylinder, $29.00 starter magnetos $15.00 switches $4.95 All f.o.b., New York. W A Gauther, 139 West 75th St., New York N Y

REBUILT OX-5 motors like new $175.00 Used OX 5 motors $95.00 Like new cylinders $15.00 Slightly used, $10.00 OX parts cheap Justice Airmail Supply Co., St. Louis Mo.

FAST HANDSOME cabin monoplane. New ship New Hisso motor Splendid performance Carries three and pilot Exceptional buy Special job at much less than production type Photos or demonstration to responsible buyer Act quick. Box 1169, AVIATION

ATTENTION, AVIATORS Valve guides installed on OX cylinders $1.50 per guide Removable valve seats installed $1.00 Descriptive literature upon request. All work guaranteed Illinois Flying Co, New Location, 4 West 4th St Sterling, Ill

FOR SALE New Paragon and Star OX-5 propellers $30.00. OX 5 motors $400.00. Good Jenny ready to fly away, like new, $1,000.00 Write for parts list. Southern Aeroplane & Supply Co Knoxville, Tenn.

CYLINDERS REBUILT Graphited guides and valve seats installed OX-5 and OXX-6 $5.00 per cylinder Discount to dealers South Street Auto Parts Co, Iola, Kans

FOKKER C-2, three place cabin biplane BMW motor 185 hp perfect flying condition Special job for photography Priced reasonable for quick sale W A Gauther 139 W 75th St., New York City

THOMAS MORSE, tube control, new LeRhone extra LeRhone, lots of spares, now flying Just the ship to get your 200 hours $850.00. Ford Neff Iola Kans

FOR SALE Sopwith Snipe single place This ship is complete, never been set up, just recovered Has 130 h.p. Clerget just overhauled One extra Clerget Have all diagrams for same Sell all for $750.00 L. Langevin, 19 Charlotte St Peterborough N Y

FOR SALE Two late model Ryan broughams used as demonstrators. Unusual opportunity. Midwest Airways Corp, Ryan Distributors, Aurora, Ill

ONE WACO 9 cabin biplane dual controls guaranteed to have never been cracked up looks like new OX-5 motor perfect $1450.00 without motor $1100.00 Two Wrigge cabinets and tail surfaces for 1926 American Eagle in A1 condition at half price One brand new Wright Hisso H 300 hp $650.00 Two complete Wright E Hisso, 180 hp complete with Hamilton propeller and oil radiators in A1 condition $750.00 each or will trade all for new or used OX 5 motors. Hickles Bros Lebanon Ohio

INCREASED MAIL loads requiring larger Boeing equipment release for immediate cash sale Eighteen J-5C Universal, Boeing J-4 training Travel Air J-4 three place Whirlwind steel propellers (new and used) spare Liberty parts and equipment all of greatly reduced figures. Price list on request Pacific Air Transport, Oakland Municipal Airport, Oakland Calif

FOR SALE Monocoupe used 20 hours, $2250.00 Waco 10 large wheels used 120 hours $2250.00 both in perfect condition Knoxville Aero Corp, 211 W Cumberland Ave Knoxville Tenn

COMPLETELY REBUILT OX-5, new magnetos all new bearings, rings and overhead $350.00. Electric starter and lots of new spare parts $700.00 Box 1161 AVIATION

FOR SALE New Cessna monoplane Whirlwind engine. Bought for team completed race but not entered. With special equipment sells for $9500.00 Firm $7400.00 takes it. Owen Hangland, Ranger Texas.

FOR SALE OX 5 Command Aire, 125 hours, with or without motor Never cracked Box 866 Laurel Miss

FOR SALE Ryan brougham Wright Whirlwind engine Fine condition only 200 hours Privately owned Price $9,000.00. Address C F Lyttle, Marfa Texas.

FOR SALE OX-5 Hammondsport motor, brand new, $900.00. Thoroughly rebuilt OX 5 $350.00. Air King less motor and propeller $600.00. Waco 10 OX-5 motor Scintilla magneto fine condition $2150.00 New York Aircraft Distributors Inc. Curtiss Field Garden City N Y

FOR SALE One set complete Waco 9 wings including balanced ailerons in perfect condition Will sell set complete or separate E. A. Forner, 503 Hudson St Jackson Mich.

$85.00 USED 120 LeRhone with new propeller Grade A cotton 35c yard Turnbuckles 12c each Joe Edeskuty Aircraft, 1727 Fifth Ave So., Minneapolis Minn

FOR SALE Super Swallow in good condition less motor, $750.00. Bennett Flying Association, 223 West 12th St, Kansas City, Mo

FOR SALE One Standard steel propeller for 225 hp motor Slightly used but in perfect condition, having been refinished, buffed and balanced, and in original shipping case as received from factory Price $300.00 Hubbard Morgan Kittanning Pa

MUST SACRIFICE new 50 h.p. Alco biplane $465.00 Pictures on request. WANTED 35 h.p. Anzani, Heath Henderson or Irwin motor with propeller Richards, 1470 Middleton Rd Cleveland Heights, Ohio.

POSITIONS WANTED

LICENSED AIRPLANE and engine mechanic No 2875 available April 1 Seven years experience on military and commercial aircraft Geo J Chapman, R.R. 16 Dayton, O

POSITION WANTED by thoroughly experienced pilot Can furnish excellent references as to character and ability Box 1148, AVIATION

YOUNG MAN (21 years) desires to learn aircraft construction and maintenance with some aircraft manufacturing company Can do welding Box 1170, AVIATION

BANK CASHIER, 11 years' bank experience desires connection with aircraft corporation. Good references Married Paul R. Berndt Bridgman, Mich

FIELD MANAGER, capable of laying out airports, long experience in drainage, wants to change position. Paul Dowsel, 664 Hamilton St, Ridgefield N J

TRANSPORT PILOT with 500 hours on cross country and instructing References. 449 10 St North, Apt C, Lincoln, Nebr

POSITION WANTED by transport pilot 12 years, 4,000 hours experience Best of references. Box 1173, AVIATION

LICENSED TRANSPORT pilot at liberty 360 hours Write or wire Transport Pilot, 663 Lawn Ridge Ave Huron South Dakota

EQUIPMENT WANTED

WANTED 50 to 60 hp., air cooled engine State conditions and lowest price. Eugene A Beeson Jefferson Barracks, Mo, Route 9

WANTED LICENSED Waco 10 or Eaglerock. Will pay about $1500.00. Cone Blanchette 17204 Orleans Detroit, Mich

WANTED IRWIN Meteorplane Heath Parasol or other light plane Also light air cooled motors Will buy in separate units or complete State lowest price for each Clifford Bengston, Grand Canyon Ariz

WANTED 50 used OX-5 motors and parts. State price, condition first letter Box 1171, AVIATION

WANTED OX 5 motors, also steel propellers with OX 5s and Hissos Bennett Flying Association, 223 West 12th St Kansas City Mo

WANTED WRIGHT J-4 or J-5 motor, poor condition Price must be right Address P O Box 247 Akron Ohio.

WANTED Three place late production ship less motor May be in need of recovering and minor repairs. Bill Reed, 237 Monroe Blvd., S Dearborn Mich

WANTED CRACKED new production ships motors and parts OX 5s C 6 and Hissos Skycraft, Inc., 143 E 29th St., New York N Y

MISCELLANEOUS

$50.00 REWARD Irving ranger seat pack parachute No 10412 stolen, R O Bane Co Inglewood Calif

FOR LOW rate flying instruction write P O Box 45 Moundsville W Va

AIRPLANES COMPLETELY stress analyzed. Acceptance by Department of Commerce guaranteed Box 1167, AVIATION

COMMERCIAL OPERATOR to lease commercial rights well developed airfield on trans-continental route Fine opportunity for school taxi, plane sales. Write Airport Corporation, Sterling, Ill.

HELP WANTED

WANTED BY major mail contractor—pilot with cross country night and bad weather flying experience Those with less than 2000 hours flying on larger equipment need not apply Steady employment, good salary Box 1091, AVIATION

WANTED: STRESS analysis man with some drafting ability An opportunity for a very broad experience to the right party Ideal living conditions. State qualifications and salary expected Aerial Service Corp., (Mercury Aircraft), Hammondsport N Y

CHECKER: EXPERIENCED on airplane design work State age, experience and salary. Apply Keystone Aircraft Corp, Bristol, Pa

WANTED LICENSED engine and airplane mechanic with small amount of capital to take active part in new Massachusetts flying corporation. Starting operations this spring Box 1168, AVIATION

DRAFTSMAN LAYOUT with several years aircraft experience. Apply Keystone Aircraft Corp. Bristol Pa

MAN FAIRLY conversant with aeroplane stock record keeping, routing and inventory BOX 1166 AVIATION

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